

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

**UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office**

June 22, 2004

**THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM
THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK
OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT
APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A
FILING DATE.**

APPLICATION NUMBER: 60/468,508

FILING DATE: May 07, 2003

RELATED PCT APPLICATION NUMBER: PCT/US04/13880

REC'D 28 JUN 2004

WIPO

PCT

**By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS**



N. Woodson
N. WOODSON
Certifying Officer

**PRIORITY
DOCUMENT**

SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH RULE 17.1(a) OR (b)

BEST AVAILABLE COPY

05/07/03
JC960 U.S. PTO

05-08-30468508-050703
H/PRO
\$
Attorney Docket No. 026032-4346

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Anderson et al.
Title: ATTACHMENT
SYSTEM FOR
MODULES IN A
VEHICLE
Application No.: To be determined
Filing Date: To be determined
Art Unite: To be determined

CERTIFICATE OF EXPRESS MAILING	
I hereby certify that this correspondence is being deposited with the United States Postal Service's "Express Mail Post Office To Addressee" service under 37 C.F.R. § 1.10 on the date indicated below and is addressed to: Commissioner for Patents, PO Box 1450, Alexandria, Virginia 22313-1450.	
EL 716377607 US (Express Mail Label Number)	May 7, 2003 (Date of Deposit)
Deborah A. Kocorowski (Printed Name)	
<i>Deborah A. Kocorowski</i> (Signature)	

JC971 U.S. PTO
60/468508
05/07/03

Attorney Docket No.: 026032-4346

Mail Stop **PROVISIONAL PATENT APPLICATION**
Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

PROVISIONAL PATENT APPLICATION
TRANSMITTAL

Transmitted herewith for filing under 37 C.F.R. § 1.53(c) is the provisional patent application of:

Rick A. Anderson
13636 Lincoln Street
Grand Haven, Michigan 49417

Andrew K. Ruiter
13137 Acacia Drive
Michigan

Thomas S. Hodgson
1009 E. 10th Street
Holland, Michigan 49423

Mathias R. Fox
4563 Majestic Vue
Zeeland, Michigan 49464

Steven M. Spoerre
3979 62nd Street
Holland, Michigan 49423

Attorney Docket No. 026032-4346

Matthew A. Kalis
3703 Black Creek Drive
Hudsonville, Michigan 49426

Mark P. Kadzban
304 Maier Court
Grandville, Michigan 49418-2171

Kermit M. Anderson
290 Sandy Court
Holland, Michigan 49424

Bryan T. Jones

Enclosed are:

- ☒ Application Data Sheet (37 C.F.R. § 1.76) (8 pages).
- ☒ Specification and Abstract (14 pages).
- ☒ Informal drawings (26 sheets, Figures 1-25).

The filing fee is calculated below:

	Rate	Fee Totals
Basic Fee	\$160.00	\$160.00
<input type="checkbox"/> Small Entity Fees Apply (subtract ½ of above):	=	\$0.00
TOTAL FILING FEE:	=	\$160.00

- ☒ Check No. 12308 in the amount of \$160.00 to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 06-1447. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Assistant Commissioner is authorized to charge the unpaid amount to Deposit Account No. 06-1447.

Attorney Docket No. 026032-4346

Please direct all correspondence to the undersigned attorney or agent at the address indicated below.

Respectfully submitted,

Date MAY 7, 2003By 

FOLEY & LARDNER

Customer Number: 26371



26371

PATENT TRADEMARK OFFICE

Telephone: (414) 297-5591

Facsimile: (414) 297-4900

John M. Lazarus
Attorney for Applicants
Registration No. 48,367

Application Data Sheet**Application Information**

Application Type:	Provisional
Subject Matter:	Utility
Suggested classification:	
Suggested Group Art Unit:	
CD-ROM or CD-R:	None
Computer Readable Form (CRF):	No
Title:	ATTACHMENT SYSTEM FOR MODULES IN A VEHICLE
Attorney Docket Number:	026032-4346
Request for Early Publication:	No
Request for Non-Publication:	No
Suggested Drawing Figure:	1
Total Drawing Sheets:	26
Small Entity:	No
Petition included:	No
Secrecy Order in Parent Application:	No

Applicant Information

Applicant Authority Type:	Inventor
Primary Citizenship Country:	US
Status:	Full Capacity
Given Name:	Rick A.
Family Name:	Anderson
City of Residence:	Grand Haven

State or Province of Residence: Michigan
Country of Residence: US
Street of mailing address: 13636 Lincoln Street
City of mailing address: Grand Haven
State or Province of mailing address: MI
Postal or Zip Code of mailing address: 49417

Applicant Authority Type: Inventor
Primary Citizenship Country: US
Status: Full Capacity
Given Name: Andrew K.
Family Name: Ruiter
City of Residence:
State or Province of Residence: Michigan
Country of Residence: US
Street of mailing address: 13137 Acacia Drive
State or Province of mailing address: MI
Postal or Zip Code of mailing address: MI

Applicant Authority Type: Inventor
Primary Citizenship Country: US
Status: Full Capacity
Given Name: Thomas S.
Family Name: Hodgson

City of Residence: Holland
State or Province of Residence: Michigan
Country of Residence: US
Street of mailing address: 1009 E. 10th Street
City of mailing address: Holland
State or Province of mailing address: MI
Postal or Zip Code of mailing address: 49423

Applicant Authority Type: Inventor
Primary Citizenship Country: US
Status: Full Capacity
Given Name: Mathias R.
Family Name: Fox
City of Residence: Zeeland
State or Province of Residence: Michigan
Country of Residence: US
Street of mailing address: 4563 Majestic Vue
City of mailing address: Zeeland
State or Province of mailing address: MI
Postal or Zip Code of mailing address: 49464

Applicant Authority Type: Inventor
Primary Citizenship Country: US
Status: Full Capacity

Given Name: Steven M.
Family Name: Spoerre
City of Residence: Holland
State or Province of Residence: Michigan
Country of Residence: US
Street of mailing address: 3979 62nd Street
City of mailing address: Holland
State or Province of mailing address: MI
Postal or Zip Code of mailing address: 49423

Applicant Authority Type: Inventor
Primary Citizenship Country: US
Status: Full Capacity
Given Name: Matthew A.
Family Name: Kalis
City of Residence: Hudsonville
State or Province of Residence: Michigan
Country of Residence: US
Street of mailing address: 3703 Black Creek Drive
City of mailing address: Hudsonville
State or Province of mailing address: MI
Postal or Zip Code of mailing address: 49426

Applicant Authority Type: Inventor

Primary Citizenship Country: US
Status: Full Capacity
Given Name: Mark P.
Family Name: Kadzban
City of Residence: Grandville
State or Province of Residence: Michigan
Country of Residence: US
Street of mailing address: 304 Maier Court
City of mailing address: Grandville
State or Province of mailing address: MI
Postal or Zip Code of mailing address: 49418-2171

Applicant Authority Type: Inventor
Primary Citizenship Country: US
Status: Full Capacity
Given Name: Kermit M.
Family Name: Anderson
City of Residence: Holland
State or Province of Residence: Michigan
Country of Residence: US
Street of mailing address: 290 Sandy Court
City of mailing address: Holland
State or Province of mailing address: MI
Postal or Zip Code of mailing address: 49424

Applicant Authority Type: Inventor
Primary Citizenship Country: US
Status: Full Capacity
Given Name: Bryan T.
Family Name: Jones
City of Residence:
Country of Residence:
Street of mailing address:

Correspondence Information

Correspondence Customer Number: 26371
E-Mail address: jlazarus@foleylaw.com

Representative Information

Representative Designation:	Registration Number:	Representative Name:
Primary	46,521	SCOTT D. ANDERSON
Primary	29,512	RUSSELL J. BARRON
Primary	39,902	DAVID J. BATES
Primary	42,308	STEVEN C. BECKER
Primary	51,495	MICHAEL S. BRAYER
Primary	52,673	MARCUS A. BURCH
Primary	35,093	CHARLES G. CARTER
Primary	44,603	ALISTAIR K. CHAN
Primary	26,416	JOHN C. COOPER III
Primary	52,801	SCOTT M. DAY
Primary	30,844	BARRY L. GROSSMAN

Primary	47,619	JEFFREY S. GUNDERSEN
Primary	44,787	PAUL S. HUNTER
Primary	48,367	JOHN M. LAZARUS
Primary	47,746	KENNETH G. LEMKE
Primary	40,365	KEITH D. LINDENBAUM
Primary	39,282	DAVID G. LUETTGEN
Primary	52,008	MICHAEL SCOTT MC BRIDE
Primary	35,610	RICHARD J. MC KENNA
Primary	32,505	JAMES G. MORROW
Primary	50,755	SCOTT C. NIELSON
Primary	45,651	JASON E. PAULS
Primary	38,276	TODD A. RATHE
Primary	30,128	MICHAEL D. RECHTIN
Primary	48,580	MARCUS W. SPROW
Primary	47,959	M. REED STAHELI
Primary	43,193	JEAN M. TIBBETTS
Primary	44,456	CHRISTOPHER M. TUROSKI
Primary	38,646	JOHN A. VANOPHEM
Primary	34,279	JAMES A. WILKE
Primary	35,421	JOSEPH N. ZIEBERT
Primary	40,883	WALTER E. ZIMMERMAN

Domestic Priority Information

Application:	Continuity Type:	Parent Application:	Parent Filing Date:

Foreign Priority Information

Country:	Application number:	Filing Date:	Priority Claimed:

Assignee Information

Assignee name: Johnson Controls Technology Company

Attorney Docket No.: 026032-4346

U.S. PROVISIONAL PATENT APPLICATION
for
ATTACHMENT SYSTEM FOR MODULES IN A VEHICLE

Inventors: Rick A. Anderson
Andrew K. Ruiter
Thomas S. Hodgson
Mathias R. Fox
Steven M. Sporre
Matthew Kalis
Mark P. Kadzban
Kermit M. Anderson
Bryan T. Jones

Attorney Docket No.: 026032-4346

ATTACHMENT SYSTEM FOR MODULES IN A VEHICLE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The following patent applications are hereby incorporated by reference: U.S. Patent Application No. 09/846,811 titled "Modular System for a Vehicle" filed May 1, 2001 and U.S. Patent Application No. 10/316,162 titled "Modular System for a Vehicle" filed December 10, 2002.

FIELD

[0002] The present invention relates to an attachment system for modules for a vehicle. The present invention relates more particularly to a system for interchangeably attaching modules for use in a vehicle. The present invention relates more particularly to a system for attaching modules for use in an overhead system for a vehicle.

BACKGROUND

[0003] Placement of modules for use in an overhead location or other location of a vehicle are generally known and may include one or more modules such as storage compartments, bins, instrumentation, entertainment devices and the like. Such modules are typically formed with (or attached to) a console or other trim piece, in which the modules are often permanently, or semi-permanently, attached to the internal structure of the vehicle by attachment devices such as threaded fasteners, spring-clips or the like.

[0004] However, such known attachment devices typically are not intended to permit a user to conveniently remove one module and replace it with another module. Such known attachment devices also do not usually provide a user with the capability to rearrange the position of several modules, or to customize the content and position of the modules within the vehicle in a convenient manner.

Attorney Docket No.: 026032-4346

[0005] Accordingly, it would be advantageous to provide an attachment system for modules that provides secure retention of the module within the vehicle. It would also be advantageous to provide an attachment system for a vehicle that provides secure retention of the module in a vertical direction and a horizontal direction. It would also be advantageous to provide an attachment system for modules that permits the module to be easily and conveniently installed, removed, or replaced with other modules. It would be further advantageous to provide an attachment system for modules that is configured for concealment within the module to enhance the aesthetic appearance of the module. It would be further advantageous to provide an attachment system for modules that is configured to fit within a compartment along a surface of the module to minimize inadvertent contact with the attachment system.

[0006] Accordingly, it would be advantageous to provide an attachment system for a module having any one or more of these or other advantageous features.

SUMMARY

[0007] The present invention relates to an attachment system for coupling a module to a rail member on an interior portion of a vehicle and includes a module having a latching member attached thereto. The latching member includes a lever pivotally coupled to a pin and configured to operably engage a recess on the rail member by a quarter-turn of the lever.

[0008] The present invention also relates to an attachment system for coupling a module to a vehicle and includes a rail member positioned along an interior surface of the vehicle. A module is configured to be releasably positioned on the rail member, and a pin member is coupled to the module and has a hook configured to releasably engage the rail member when the pin member is rotated approximately 90 degrees.

Attorney Docket No.: 026032-4346

[0009] The present invention further relates to an attachment system for coupling a module to a vehicle and includes a rail member positioned along an interior surface of the vehicle and a module configured to be releasably positioned on the rail member. A latch device is configured to couple the module to the rail member. The latch device has a hook member pivotally coupled to a lever so that movement of the lever operates the hook as an over-center type device to releasably engage the rail member.

[0010] The present invention further relates to an attachment system for coupling a module to a vehicle and includes a rail member positioned along an interior surface of the vehicle and a module configured to be releasably positioned on the rail member. A latch member is configured to couple the module to the rail member. The latch member has a flange portion that is biased to coact with a recess on the rail member when the module is positioned on the rail member.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIGURE 1 is a schematic representation of a front perspective view of a module attached to an interior structure of a vehicle according to an exemplary embodiment.

[0012] FIGURE 2 is a schematic representation of a bottom view and an end view of an interior structure of a vehicle of the embodiment of FIGURE 1 according to an exemplary embodiment.

[0013] FIGURE 3 is a graphic image of an exploded back perspective view of an attachment system for a module for a vehicle according to a preferred embodiment.

[0014] FIGURE 4 is a graphic image of a perspective view of a portion of the attachment system for a module of FIGURE 3 according to a preferred embodiment.

Attorney Docket No.: 026032-4346

[0015] FIGURE 5 is a graphic image of a perspective view of a portion of the attachment system for a module of FIGURE 3 according to a preferred embodiment.

[0016] FIGURE 6 is a graphic image of a perspective view of a portion of the attachment system for a module of FIGURE 3 according to a preferred embodiment.

[0017] FIGURE 7 is a graphic image of a perspective view of a portion of the attachment system for a module of FIGURE 3 according to a preferred embodiment.

[0018] FIGURE 8 is a schematic representation of an assembly view of the attachment system for a module of FIGURE 3 according to a preferred embodiment.

[0019] FIGURE 9 is a schematic representation of a front perspective view of an attachment system for a module according to another preferred embodiment.

[0020] FIGURE 10 is a schematic representation of a front view of an attachment system for a module according to the embodiment of FIGURE 9.

[0021] FIGURE 11 is a schematic representation of an exploded perspective view of an attachment system for a module according to the embodiment of FIGURE 9.

[0022] FIGURE 12 is a schematic representation of a cross sectional view of an attachment system for a module according to the embodiment of FIGURE 9.

[0023] FIGURE 13 is a schematic representation of an exploded perspective view of an attachment system for a module according to the embodiment of FIGURE 9.

Attorney Docket No.: 026032-4346

[0024] FIGURE 14 is a schematic representation of an exploded perspective view of an attachment system for a module according to the embodiment of FIGURE 9.

[0025] FIGURE 15 is a schematic representation of a front perspective view of an attachment system for a module according to another preferred embodiment.

[0026] FIGURE 16 is a schematic representation of a cross sectional view of an attachment system for a module according to the embodiment of FIGURE 15.

[0027] FIGURE 17 is a schematic representation of a perspective view of a portion of an attachment system for a module according to the embodiment of FIGURE 15.

[0028] FIGURE 18 is a schematic representation of a cross sectional view of an attachment system for a module according to an alternative of the embodiment of FIGURE 15.

[0029] FIGURE 19 is a schematic representation of a cross sectional view of an attachment system for a module according to the embodiment of FIGURE 18.

[0030] FIGURE 20 is a schematic representation of a perspective view of a portion of an attachment system for a module according to the embodiment of FIGURE 18.

[0031] FIGURE 21 is a graphic image of a series of perspective views of an attachment system for a module according to another preferred embodiment.

[0032] FIGURES 22A through 22C are schematic diagrams of the attachment system of FIGURE 21 in various stages of deployment.

Attorney Docket No.: 026032-4346

[0033] FIGURE 23 is a schematic representation of a front perspective view of an attachment system for a module according to another preferred embodiment.

[0034] FIGURE 24 is a graphic image of a perspective view of the attachment system of FIGURE 23.

[0035] FIGURE 25 is a graphic image of a plan view of the attachment system of FIGURE 23.

DETAILED DESCRIPTION OF THE PREFERRED AND OTHER EXEMPLARY EMBODIMENTS

[0036] The attachment system for a module is shown and described for modules configured to attach to an overhead portion of a vehicle individual (shown schematically as "rails" or other elongated members positioned on an "A" surface of a "headliner" or panel). However, the description of the various embodiments of the attachment system for a module are equally applicable to attachment systems for other locations within a vehicle, such a floor areas, cargo storage areas, seat backs, side panels, etc.

[0037] Referring to FIGURE 1, a module for use in a vehicle is shown schematically positioned on an overhead panel (such as the A surface of a headliner, etc.) within the vehicle and attached to elongated members shown schematically as rail members. The modules are configured to be conveniently installed, removed, replaced and repositioned along the rails by the attachment system. Referring to FIGURE 2, one embodiment of the rail is shown schematically as including recesses that extend longitudinally along a side area, an opening that extends longitudinally along a lower surface, and a flange member that extends longitudinally along an upper edge and having apertures. According to various embodiments of the attachment system, the recesses, openings and/or apertures are configured to coact with structure provided on the modules to permit the modules to be conveniently and

Attorney Docket No.: 026032-4346

securely attached or coupled to the vehicle interior (e.g. such as via the rails). Dimensions for the rail member are shown according to an exemplary embodiment in units of millimeters.

[0038] Referring to FIGURE 3, an attachment system for a module is shown according to one preferred embodiment. The attachment system includes a latch member positioned on each side of the module. The module includes projections shown schematically as "teeth" configured to engage the apertures on the rails that are intended to minimize the tendency of the module to "slide" or otherwise move along the rails (e.g. X-axis direction) during rapid vehicle deceleration or impact events (e.g. collisions, etc.). The latch member is configured to operate as a Y-axis, quarter-turn latching device to secure the modules to the rails and prevent movement of the modules in at least the vertical (e.g. Z-axis direction).

[0039] Referring to FIGURES 4 and 5, the latch member is shown having a handle portion (e.g. lever, etc.) pivotally coupled to pin member (e.g. axle, etc.). The axle has a spring member and a "foot" (e.g. hook, lobe, tab, etc.) configured to coact with the recess on the rail.

[0040] Referring to FIGURE 6, the attachment system is actuated by aligning the handle portion axially with the pin member and positioning the handle portion and pin member so that the foot is approximately horizontal and configured to fit into the recess on the rail. The handle portion and pin member are moved inwardly against the spring force to position the foot within the recess. Referring to FIGURE 7, the handle portion is rotated approximately 90 degrees (e.g. a quarter turn) so that the foot is rotated upward within the recess, and then the handle portion is rotated downward (approximately 90 degrees) to a stowed position along the side of the module. FIGURE 8 provides additional construction and assembly details for the attachment system of FIGURE 3 according to an exemplary embodiment.

Attorney Docket No.: 026032-4346

[0041] Referring to FIGURES 9 and 10, an attachment system is shown according to another preferred embodiment. The attachment system includes a latch member positioned on one or both sides of the module and positioned for concealment behind a movable panel (shown schematically as a spring-biased, pivotal "door"). The latch member is configured to operate as a Z-axis, quarter-turn latching device to secure the modules to the rails and prevent movement of the modules in at least the vertical (e.g. Z-axis direction).

[0042] Referring to FIGURES 11 and 12, the latch member has a handle portion configured for a quarter-turn rotation by a user to actuate and release the attachment system. The handle portion is shown as rigidly (e.g. integrally, etc.) formed with a pin member (e.g. axle, etc.) having two "feet" (e.g. lobes, hooks, projections, etc.) extending therefrom. The feet are oriented on the pin member such that the feet are aligned with the opening along the bottom of the rail when the handle portion is in the "unlocked" position so that the pin member and feet may enter the opening as the module is positioned onto the rails. The handle member may then be rotated approximately 90 degrees to a "locked" position in which the feet are configured to coact with the rail by engaging an inside and outside section of the rail. According to alternative embodiments, a single foot may be provided and configured to engage the inside section of the rail, or two feet may be provided and oriented generally opposite each other on the pin member so that the feet engage opposite sections that are inside of the rail.

[0043] Referring to FIGURES 13 and 14, the attachment system is shown assembled and positioned behind a spring-biased door. The door may be pivoted or rotated to provide access to the handle member for actuation of the handle member between the locked position and the unlocked position. The spring is intended to bias the door to a normally "closed" position.

Attorney Docket No.: 026032-4346

[0044] Referring to FIGURES 15 and 16, an attachment system is shown according to another preferred embodiment. The attachment system includes a latch member positioned on one or both sides of the module and positioned for concealment behind a movable panel (shown schematically as a spring-biased, pivotal "door"). The latch member is configured to operate as a Z-axis, quarter-turn latching device to secure the modules to the rails and prevent movement of the modules in at least the vertical (e.g. Z-axis direction).

[0045] Referring to FIGURES 15 through 17, the latch member has a handle portion (shown schematically having a "slot" for receiving a "thin" object such as a coin, etc.) configured for a quarter-turn rotation by a user to actuate and release the attachment system. The handle portion is shown as rigidly (e.g. integrally, etc.) formed with a pin member (e.g. axle, etc.) having two "feet" (e.g. lobes, projections, etc.) extending therefrom. The feet are oriented on the pin member such that the feet are aligned with an opening along the flange of the rail when the handle portion is in the "unlocked" position so that the pin member and feet may enter the opening as the module is positioned onto the rails. The handle member may then be rotated approximately 90 degrees to a "locked" position in which the feet are configured to coact with the rail by engaging an inside and outside section of the rail. The pin member also includes a projection configured to engage the apertures on the rail when the module is positioned on the rail and is intended to provide structure that will minimize the tendency of the modules to move or slide along the rails during collisions or other events. According to alternative embodiments, a single foot may be provided and configured to engage the inside section of the rail, or two feet may be provided and oriented generally opposite each other on the pin member so that the feet engage opposite sections that are inside of the rail.

Attorney Docket No.: 026032-4346

[0046] Referring to FIGURES 18 through 20, an attachment system is shown according to an alternative embodiment of the attachment system of FIGURES 15 through 17. As shown schematically, the pin member may be formed with suitable "feet" or other projections to align in a locking engagement with a modified structural shape of the rail.

[0047] Referring to FIGURE 21, an attachment system is shown according to another preferred embodiment. The attachment system includes a latch device positioned on one or both sides of the module and configured for movement to a "stowed" or "locked" position within a compartment on the module such that the latch member is generally flush with the surface of the module. The latch device is configured to operate as an over-center device (e.g. "clamp," etc.) to secure the modules to the rails and prevent movement of the modules in at least the vertical (e.g. Z-axis) and longitudinal horizontal (e.g. X-axis) directions. As shown in FIGURE 21, the latch device has a handle portion (such as a lever, etc.) pivotally coupled to a bracket and to a hook member. The hook member has a "hooked" portion that is configured to engage an edge or other surface on the rail in a secure relationship. The hook member also includes a threaded interface that permits the length of the hook member to be adjusted to provide a desired degree of clamping force on the rail when the latching device is in the "locked" position.

[0048] Referring to FIGURES 22A through 22C, the latching device is shown operating through a range of motion from an "unlocked" position to a "locked" position. The handle portion is rotated outwardly to move the hook member upward to provide sufficient clearance for the hooked portion to engage the rail. The handle portion is then rotated upwardly about the pivotal coupling toward a stowed position, which draws the hook member downward into engagement with the rail. The desired degree of "clamping" force exerted by the hook member on the rail may be adjusted by varying the appropriate lengths of the latching device members or by adjusting the length of the hook member.

Attorney Docket No.: 026032-4346

[0049] Referring to FIGURE 23, an attachment system is shown according to another preferred embodiment. The attachment system includes a latch member positioned on one or both sides of the module and configured for movement to a "stowed" or "locked" position within a compartment along the side of the module so that the surface of the latch member is generally flush with the surface of the module. The latch member is configured to operate as a spring-biased, Y-axis device to secure the modules to the rails and prevent movement of the modules in at least the vertical (e.g. Z-axis direction).

[0050] Referring to FIGURES 23 through 25, the latch member has a first end pivotally coupled to the module and a second end spring biased inwardly toward a "locked" position on the module, where the latch member is recessed generally flush with the module to provide a smooth and uniform appearance. The latch member has a retainer (e.g. flange, etc.) disposed between the first end and second end that is configured to coact with the recess on the side of the rail when the retainer is in the locked position. As shown in FIGURE 23, the retainer is configured to extend through an opening (shown as a slot) in a side of the module so that the retainer can extend into a recess on the side of the rail. The attachment system is intended to operate so that when the module is positioned upwardly against the rails, the retainer(s) will be forced in an outwardly direction by the contour of the rails against the spring biasing force until the module is positioned over the rails and the retainers are aligned with the recesses. The spring bias on the latch member is intended to urge the retainers into the locked position to prevent movement of the module in the vertical (e.g. Z-axis) direction. The latch member may be moved from the locked position to an unlocked position by manually rotating the second end of the latch member outwardly against the spring bias to disengage the retainers from the recesses. According to any preferred embodiment, the retainer may be formed of any suitable material (e.g. steel, aluminum, plastic, etc.) in any suitable thickness to provide the desired strength and sheer loading capacity. The surface of the material of

Attorney Docket No.: 026032-4346

the retainer may also be provided with any suitable finish. For example, the material surface may be textured to promote a frictional interface between the retainer and the rail to inhibit movement of the module along the rail. The latching member may also be provided with projections configured to engage apertures on the rail to minimize the tendency of the modules to slide along the rails.

[0051] According to any preferred embodiment, the attachment system for a module for a vehicle is intended to provide an attachment system that is easily and conveniently accessible and operable by a wide variety of users to remove, replace, reposition, and/or install one or more modules within a vehicle, such as within or in connection with, an overhead system for a vehicle having one or more elongated members such as rails. The components of the various embodiments of the attachment system are intended to provide a lightweight, rugged, reliable and durable structure for attaching the modules to the rails (or other structure) within the vehicle. The components may be made of any suitable material such as plastic (e.g. ABS plastic, etc.), metal (e.g. aluminum, steel, etc.) or other materials that provide the desired strength to retain the modules on the rails during all appropriate loading conditions and scenarios.

[0052] It is important to note that the construction and arrangement of the elements of the various embodiments of the attachment system provided herein is illustrative only. Although only a few exemplary embodiments of the present inventions have been described in detail in this disclosure, those skilled in the art who review this disclosure will readily appreciate that many modifications are possible in these embodiments (such as variations in handle and pin member configurations, shape and size, mounting arrangements, rotational and pivoting arrangements, use of colors, combinations of shapes, etc.) without materially departing from the novel teachings and advantages of the inventions. Further, the attachment system may be used in any type of vehicle such as trucks, recreational vehicles, minivans, sport utility vehicles,

Attorney Docket No.: 026032-4346

passenger automobiles, etc. and at any suitable location within the vehicle (such as floors, cargo storage areas, etc.). Accordingly, all such modifications are intended to be within the scope of the invention as defined in the appended claims.

[0053] The order or sequence of any process or method steps may be varied or re-sequenced according to alternative embodiments. In the claims, any means-plus-function clause is intended to cover the structures described herein as performing the recited function and not only structural equivalents but also equivalent structures. Other substitutions, modifications, changes and omissions may be made in the design, operating configuration and arrangement of the preferred and other exemplary embodiments without departing from the spirit of the inventions as expressed in the appended claims.

Attorney Docket No.: 026032-4346

ABSTRACT

An attachment system for coupling a module to a rail member on an interior portion of a vehicle is disclosed and includes a module having a latching member attached thereto. The latching member includes a lever coupled to a pin and configured to operably engage a recess on the rail member by a quarter-turn of the lever. An attachment system for coupling a module to a vehicle is also disclosed and includes a rail member positioned along an interior surface of the vehicle and a module configured to be releasably positioned on the rail member. A latch device is configured to couple the module to the rail member. The latch device has a hook member pivotally coupled to a lever so that movement of the lever operates the hook as an over-center device to releasably engage the rail member.

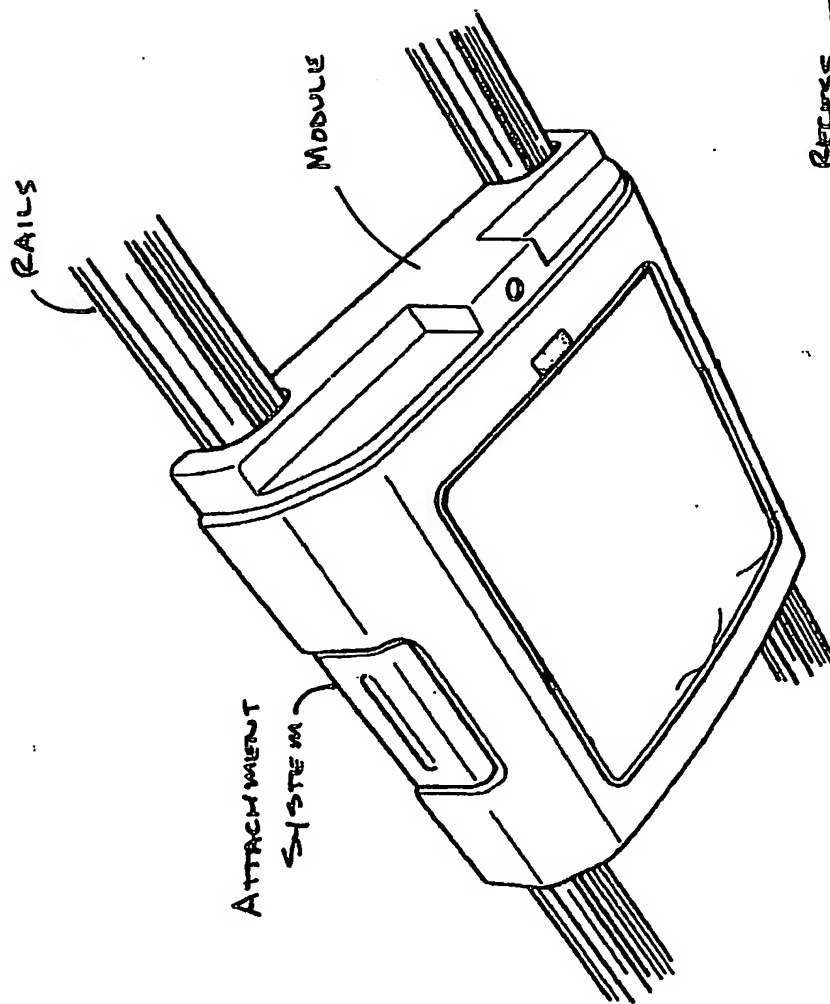


FIGURE 1

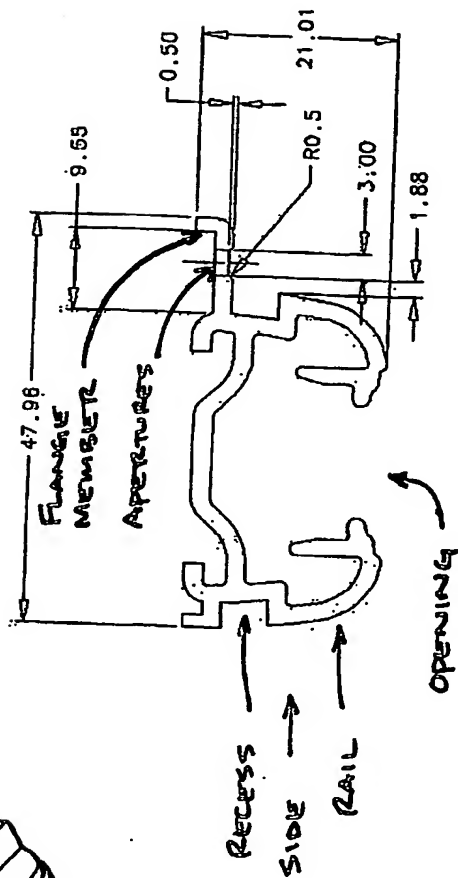
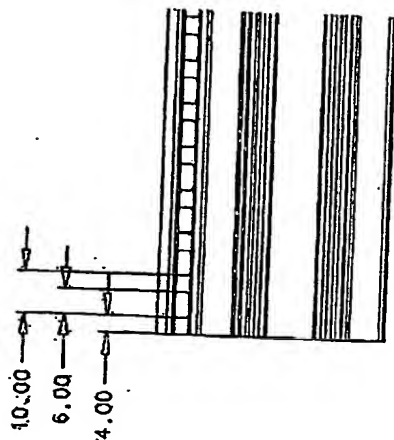


FIGURE 2

2/26

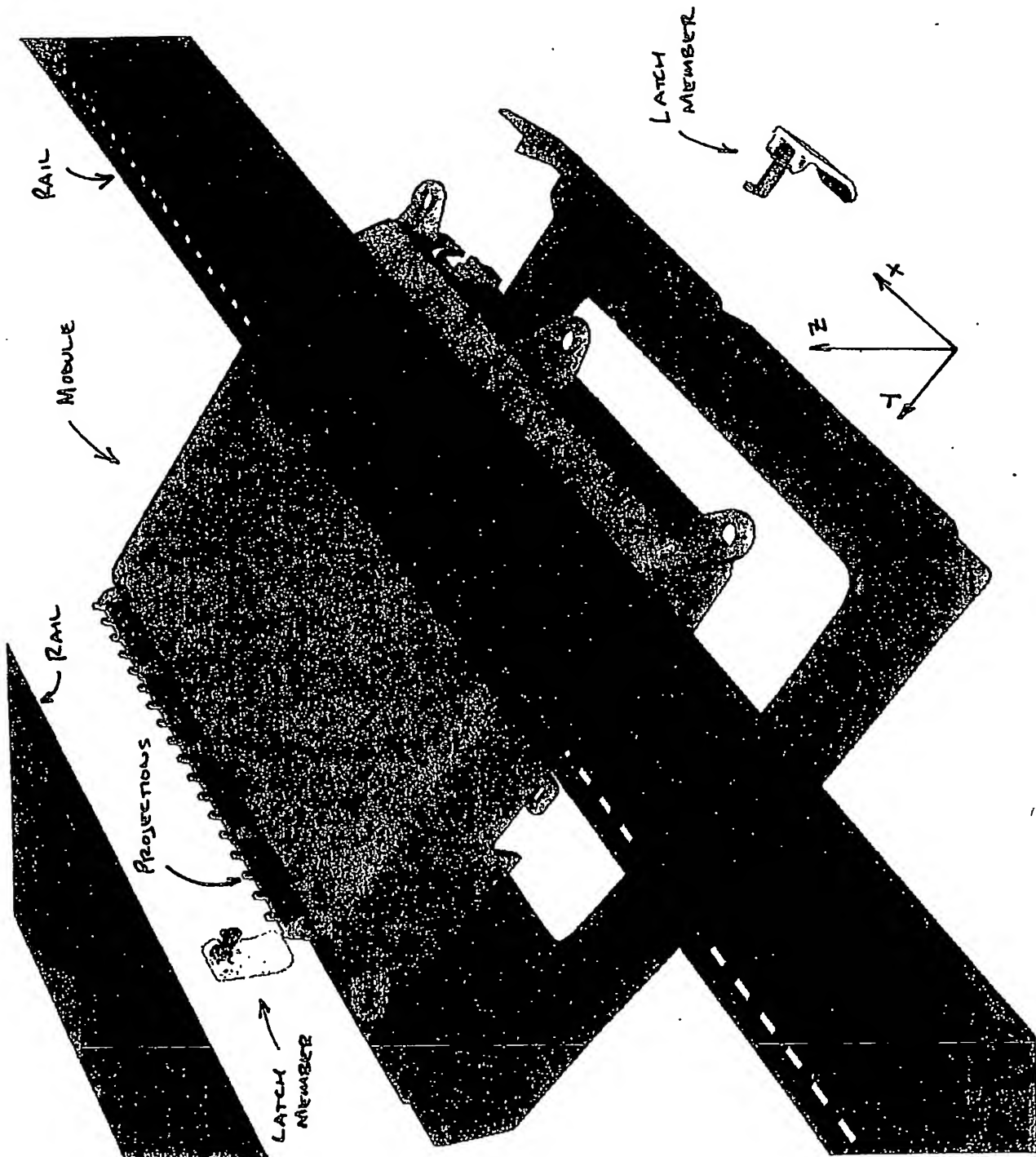


FIGURE 3

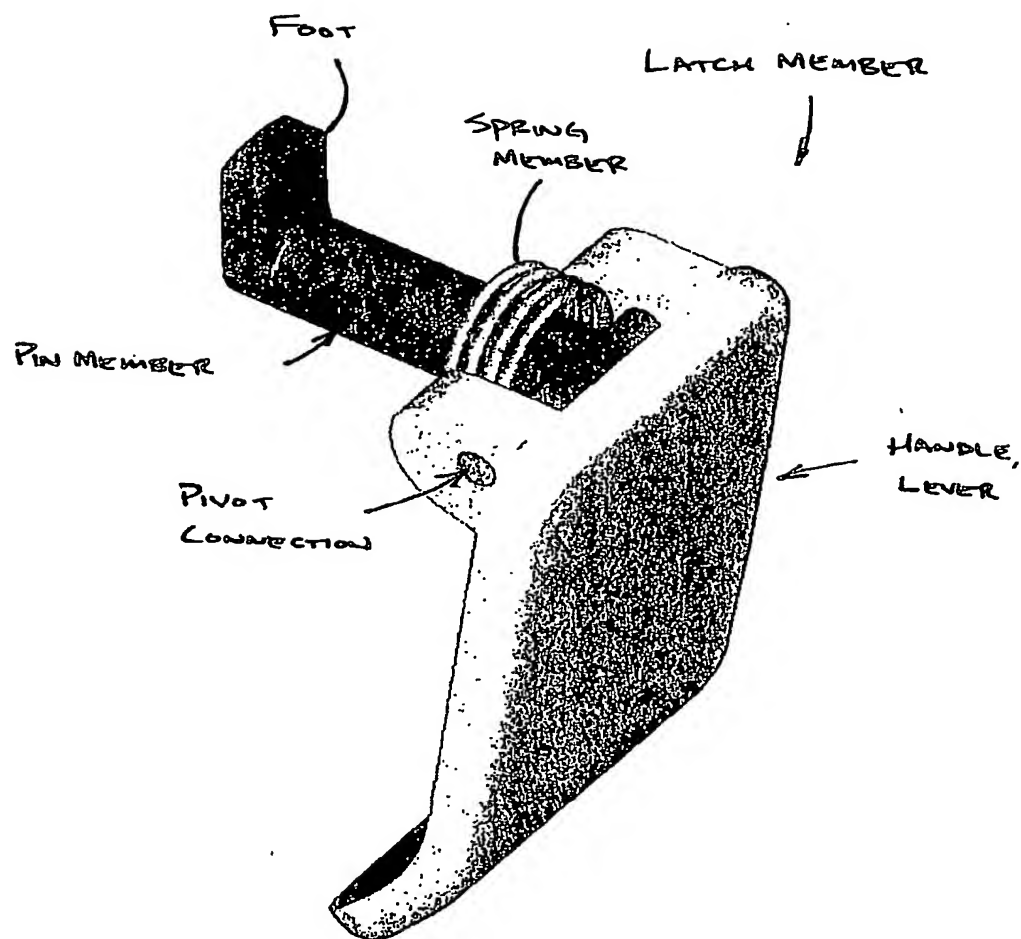


FIGURE 4

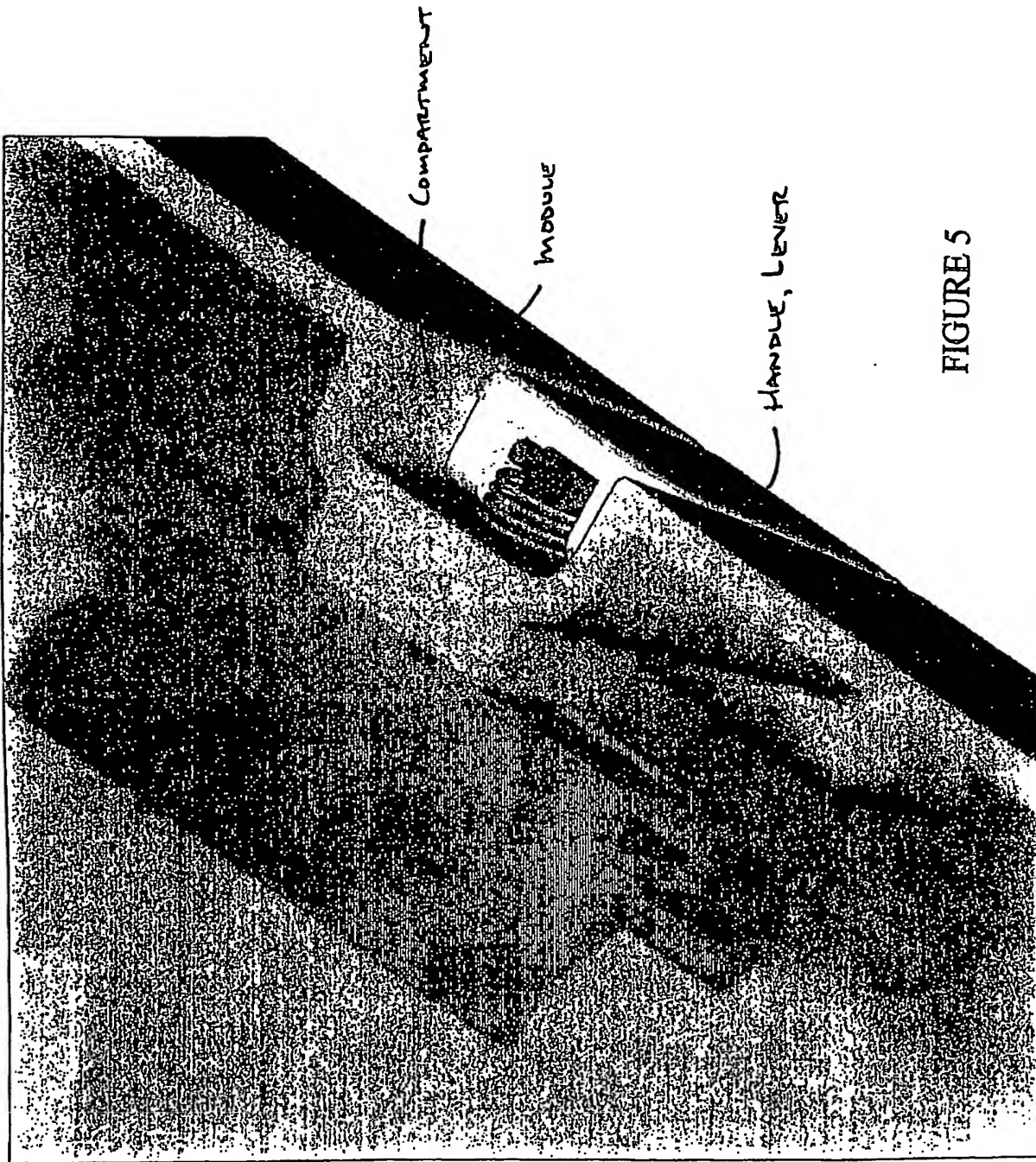


FIGURE 5

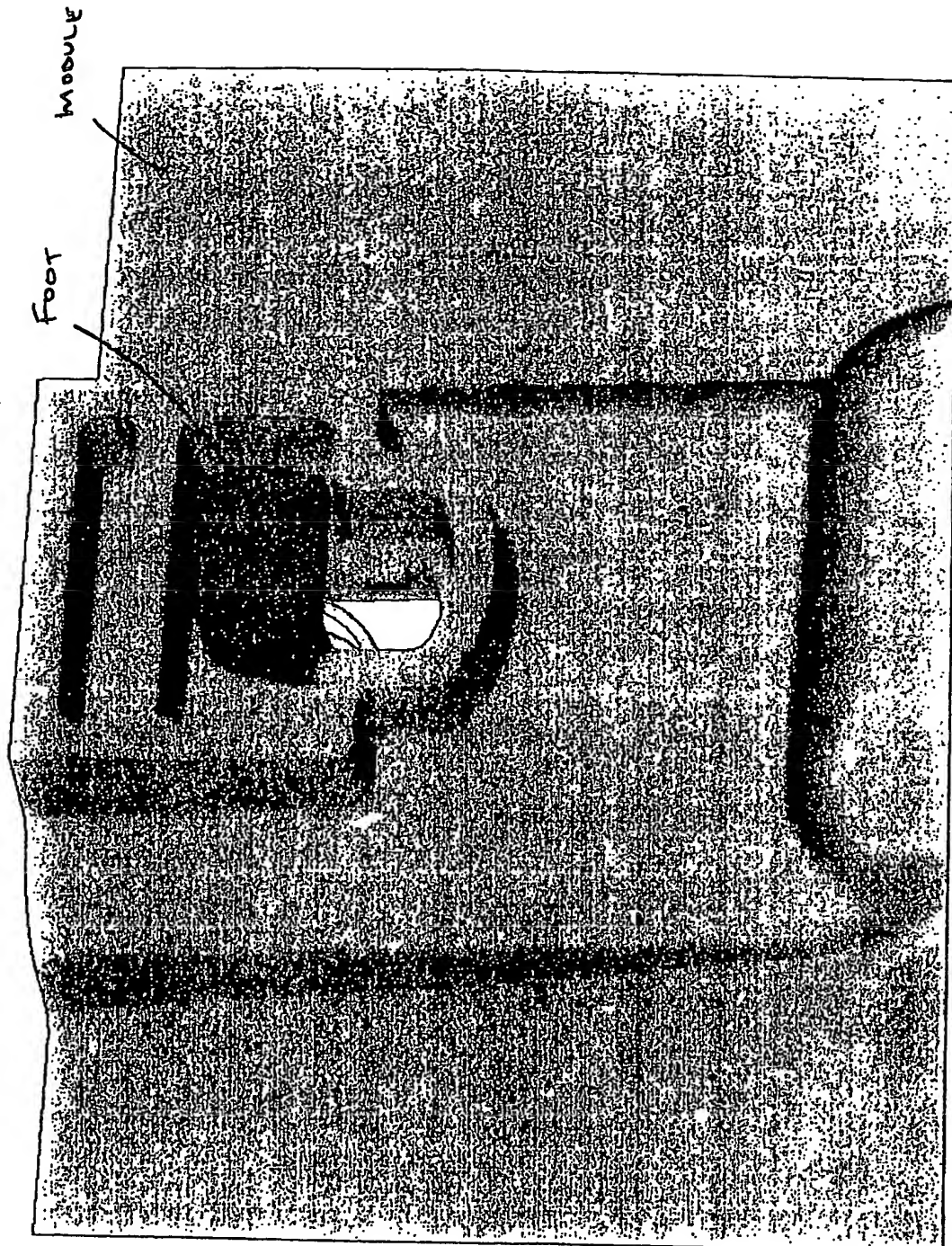


FIGURE 6

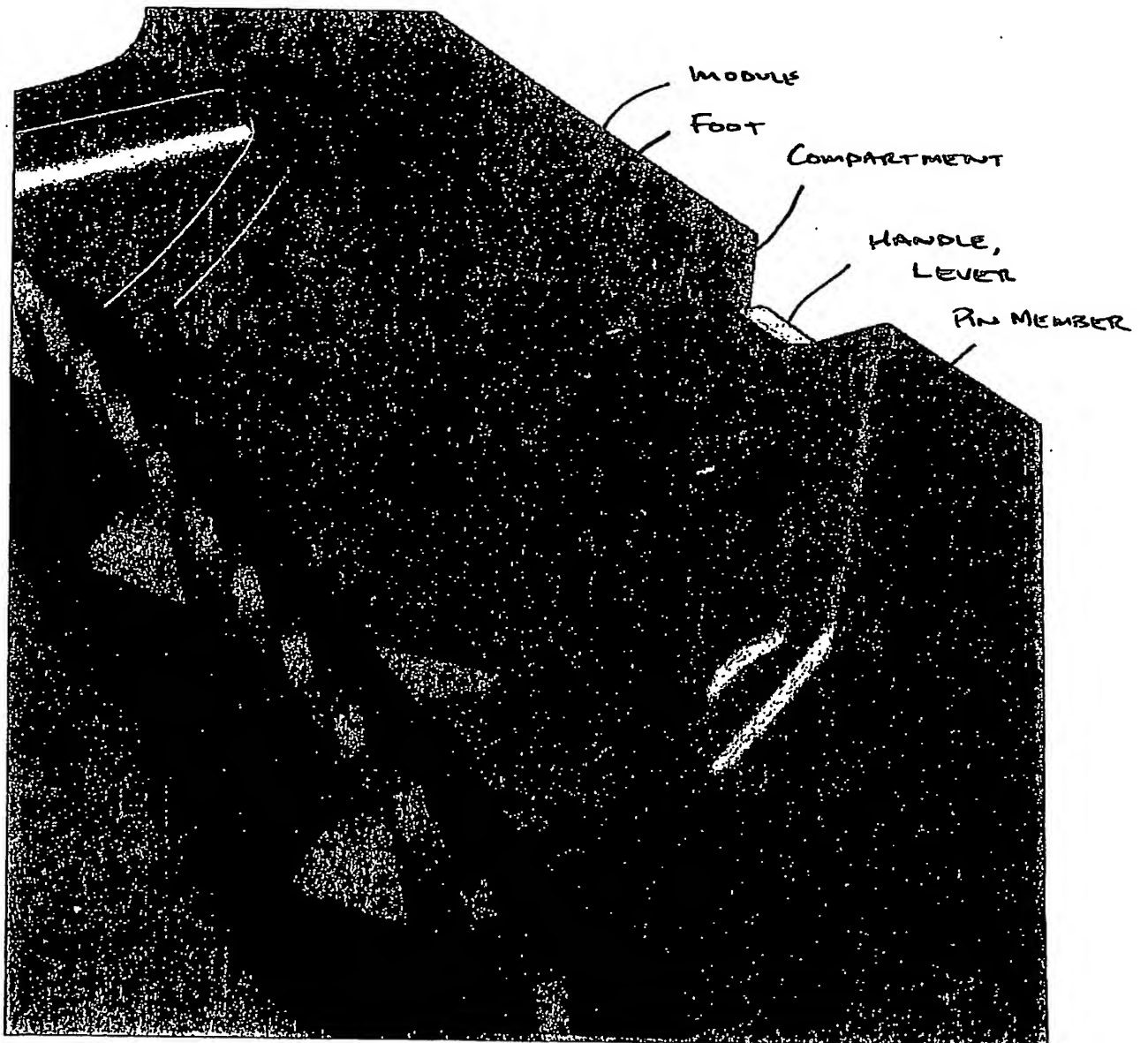


FIGURE 7

8/26

60468508.050705

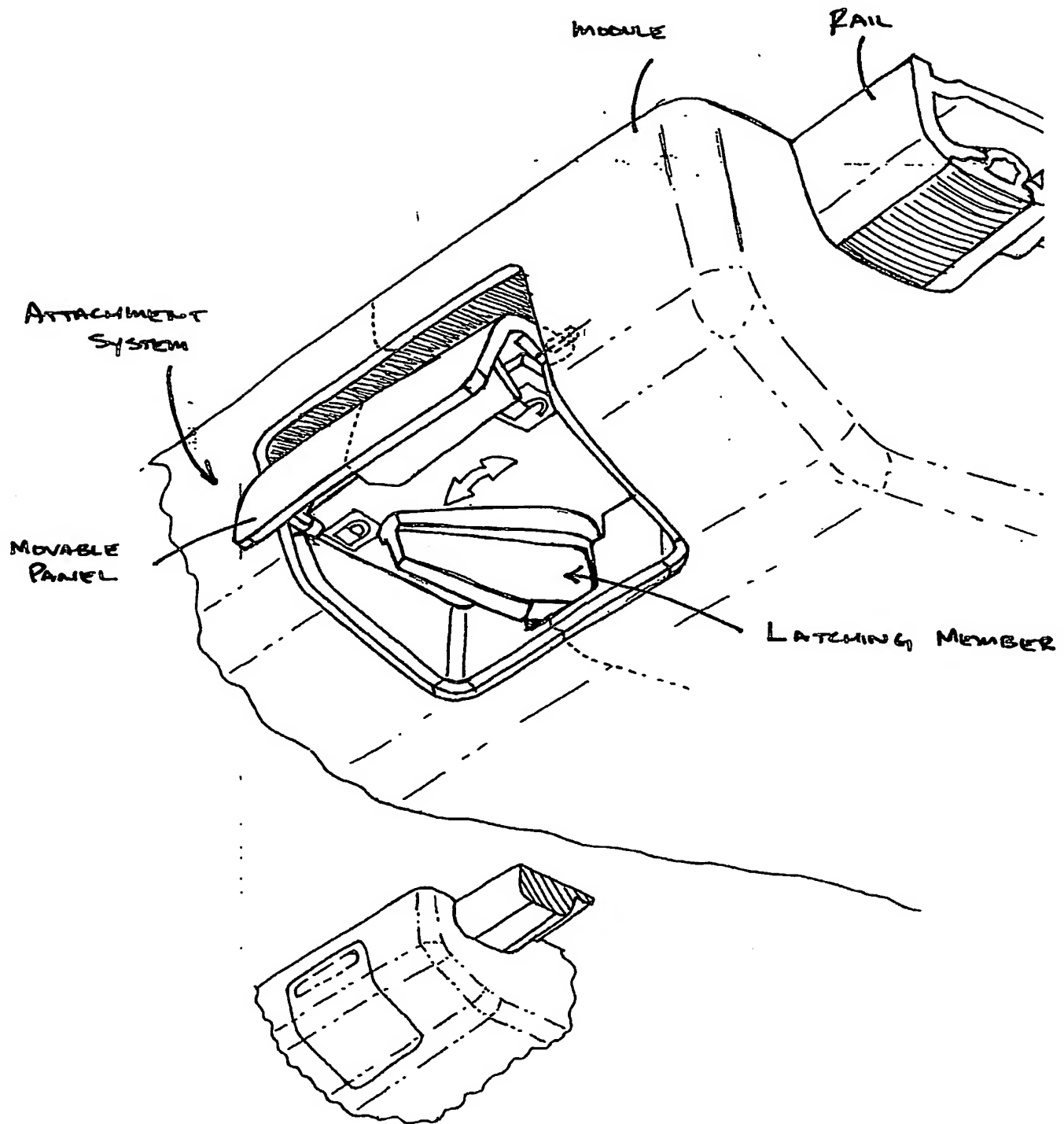


FIGURE 9

9/26

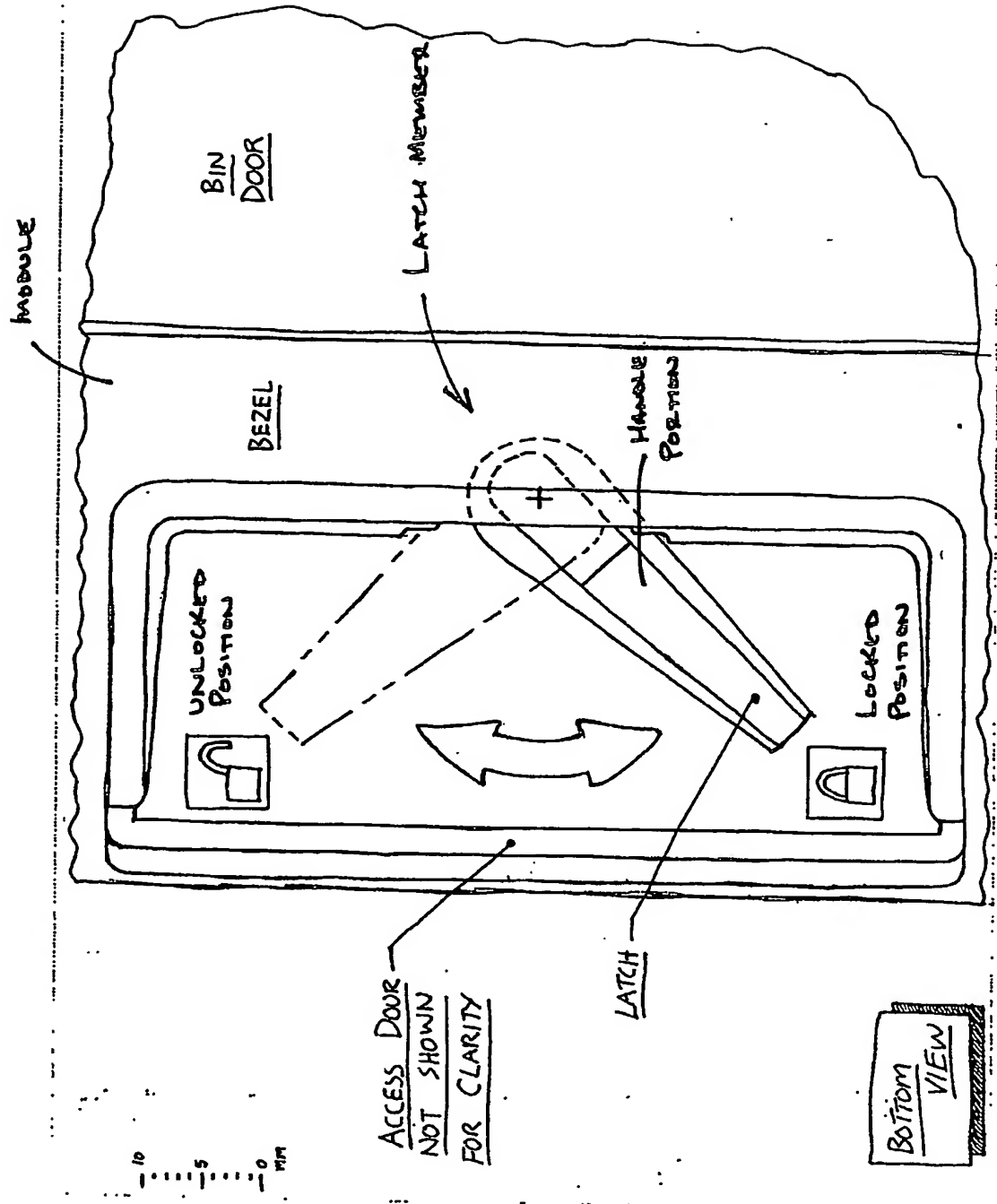


FIGURE 10

10/26

60468500-050703

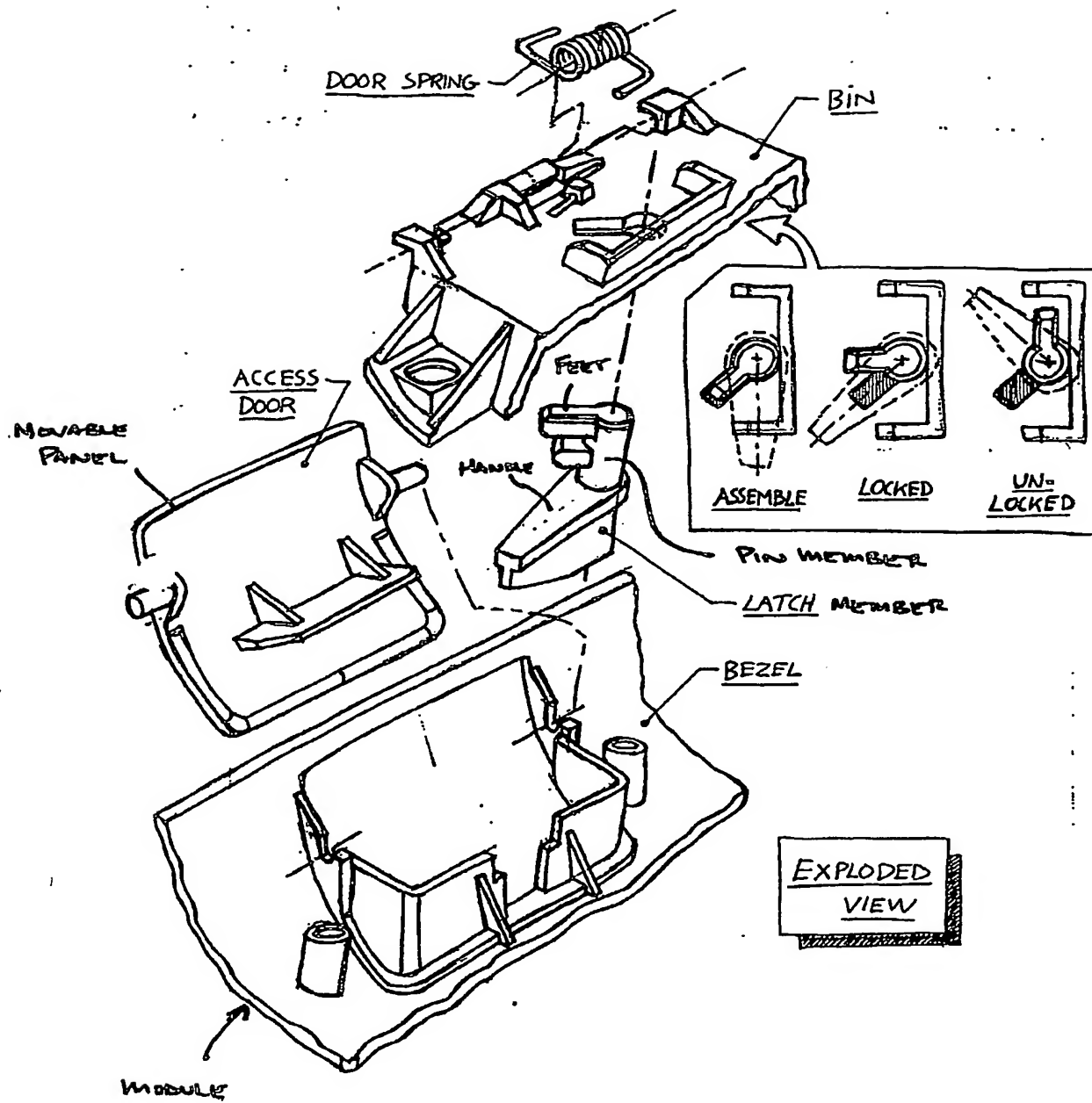


FIGURE 11

11/26

60468508.050703

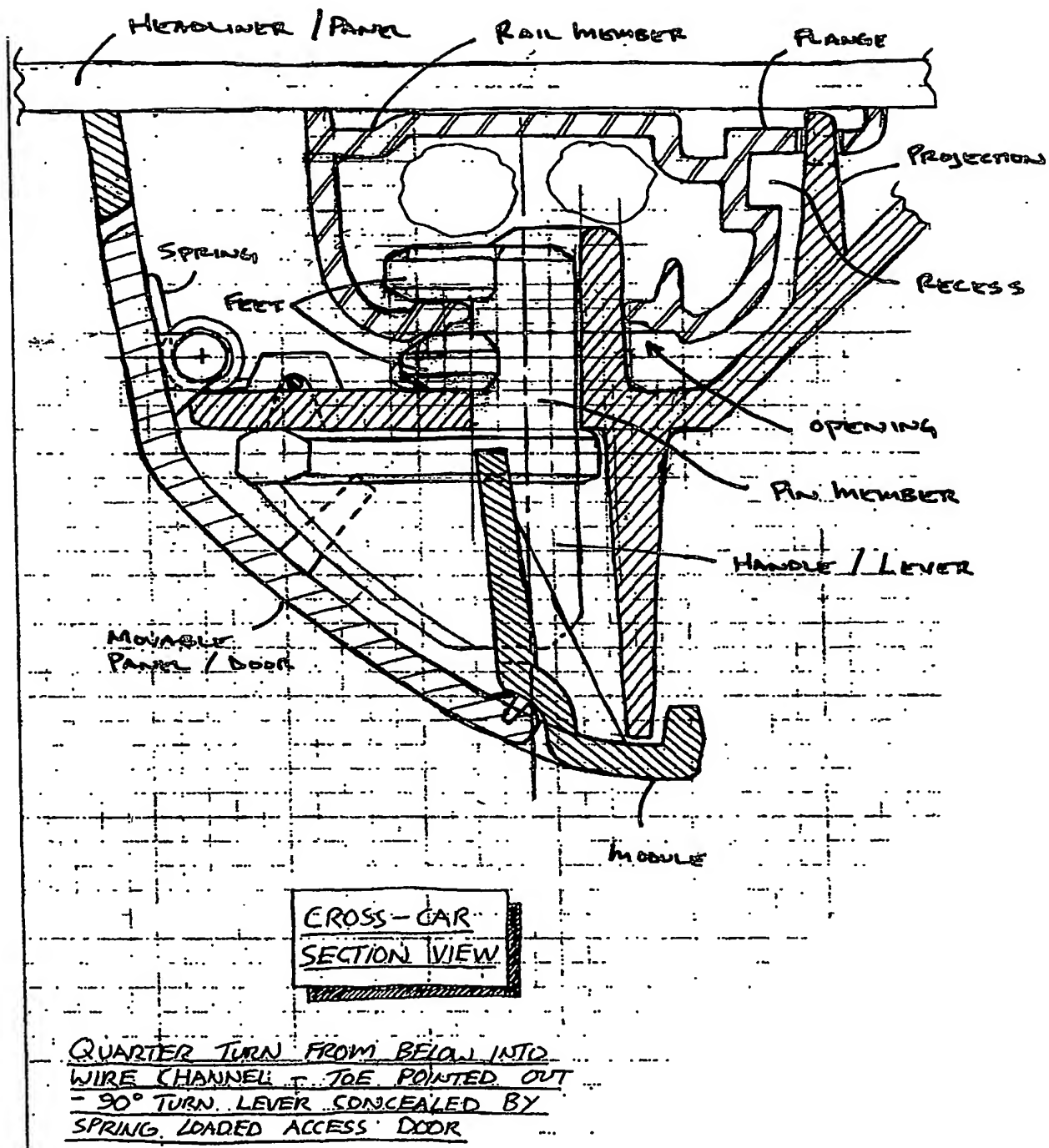


FIGURE 12

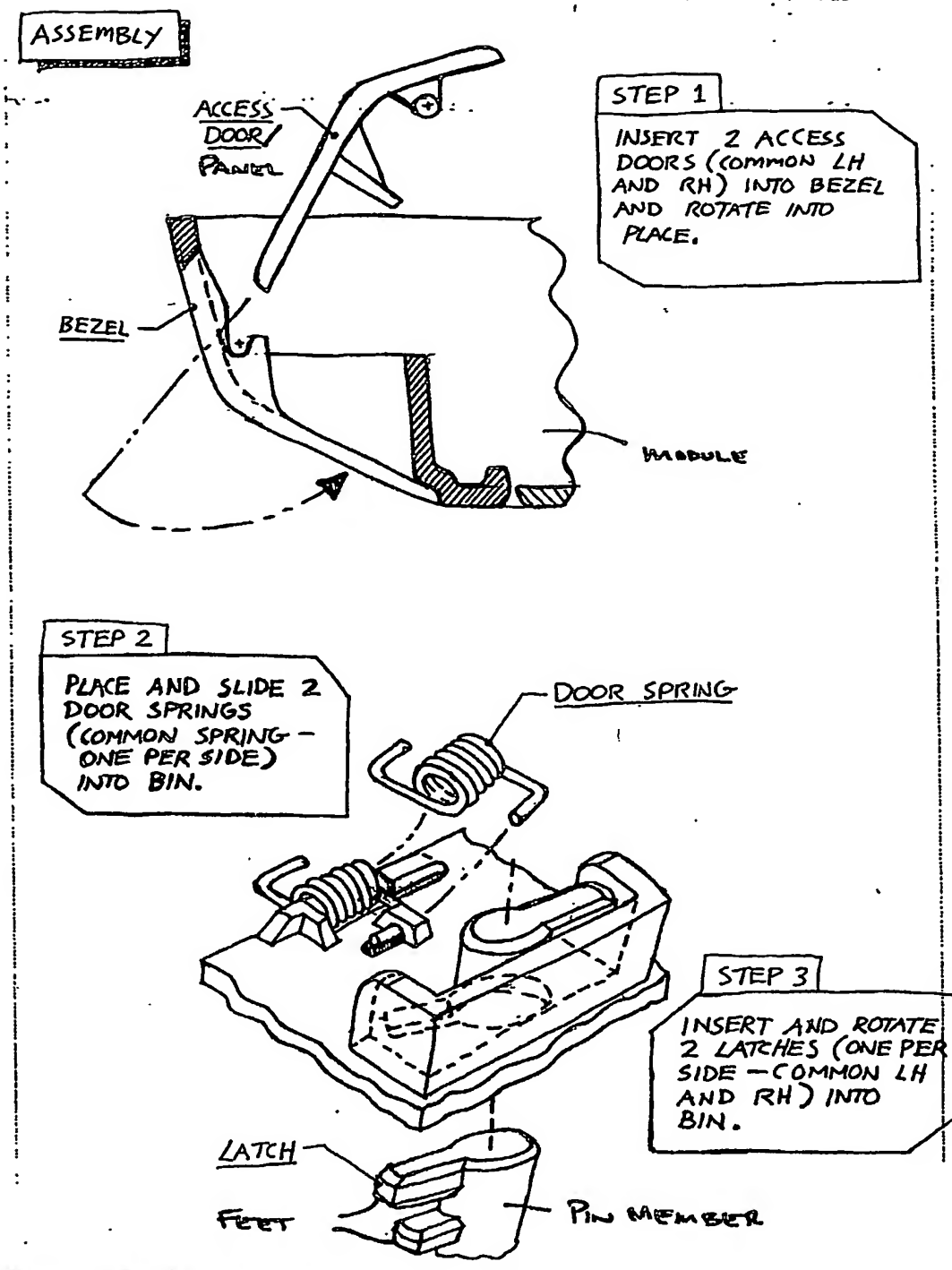
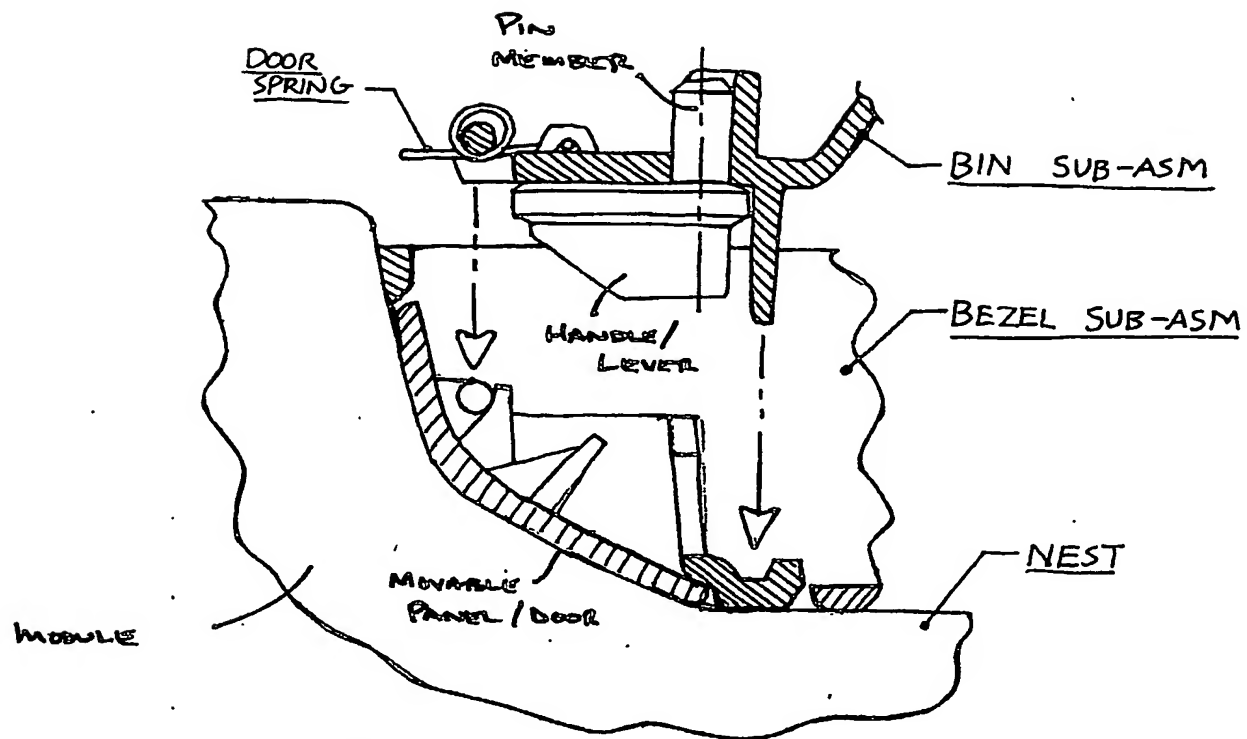


FIGURE 13

**STEP 4**

Z-LOAD BIN SUB-ASM INTO BEZEL SUB-ASM (PRELOADING THE DOOR SPRING AGAINST THE ACCESS DOOR IN THE PROCESS). HEATSTAKES THEN SECURE THE ENTIRE ASM.

FIGURE 14

14/26

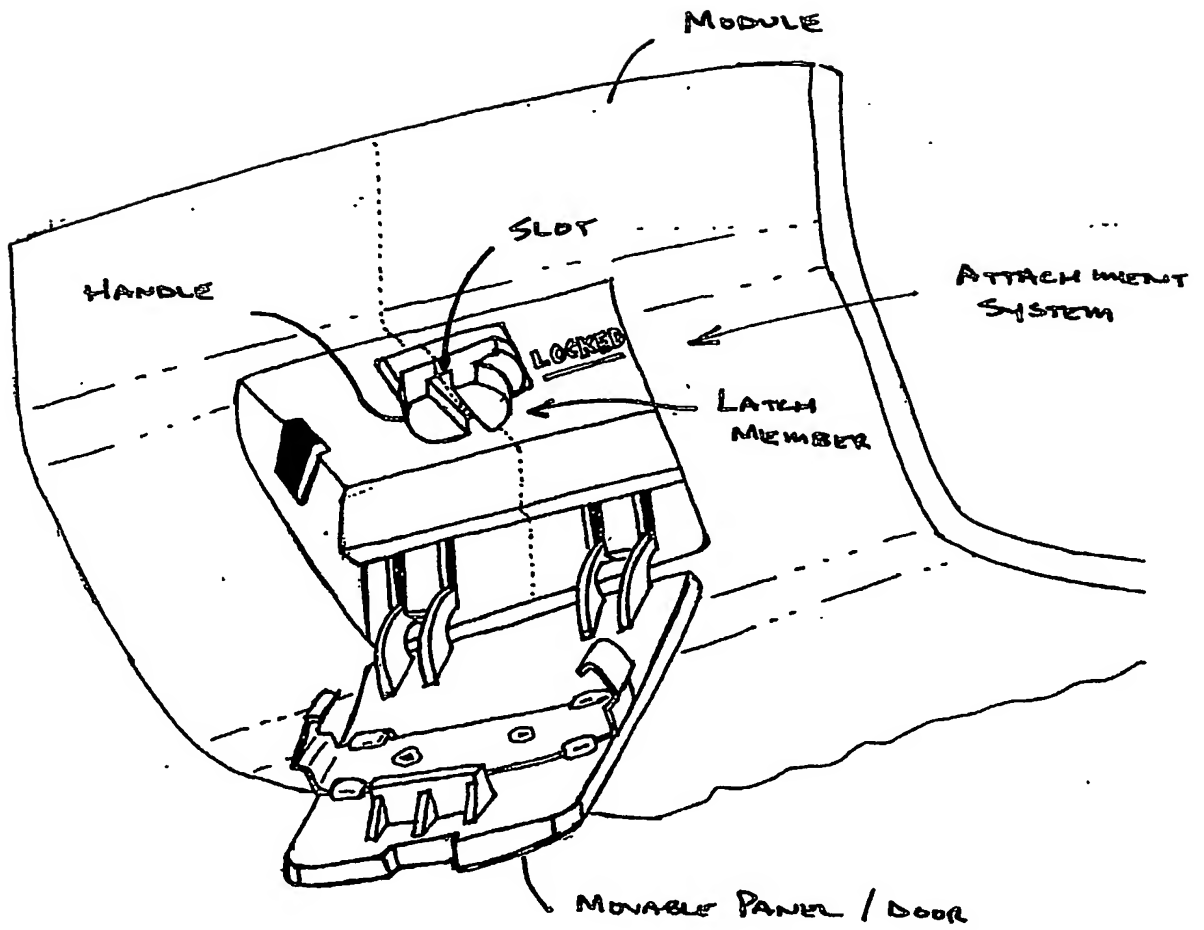


FIGURE 15

15/26

BIN ATTACHMENT CONCEPT : $\frac{1}{4}$ TURN FROM BELOW

- INTO SIDE FLANGE

TDE POINTED OUT - FLATHEAD CONCEALED BY ACCESS DOOR

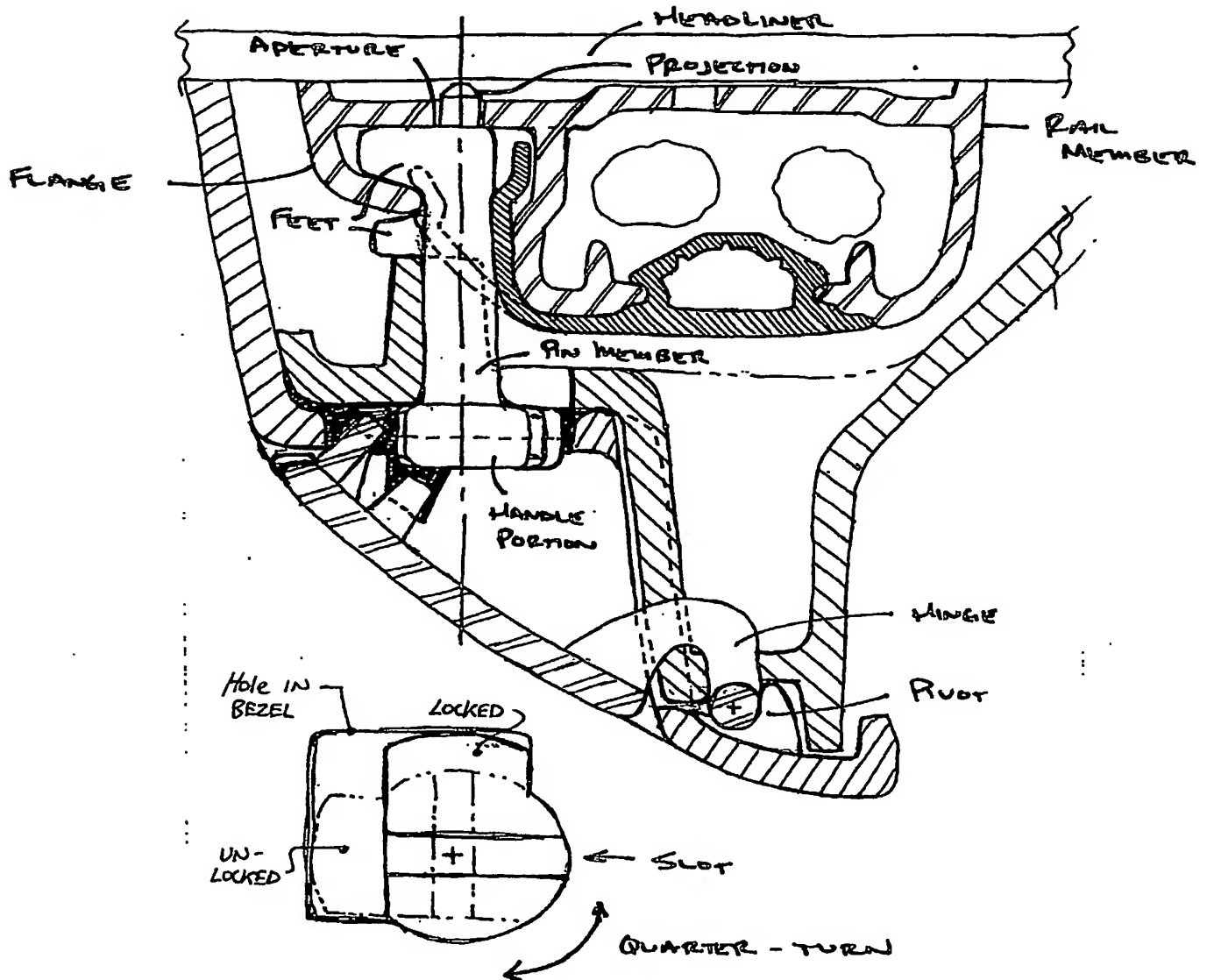


FIGURE 16

16/26

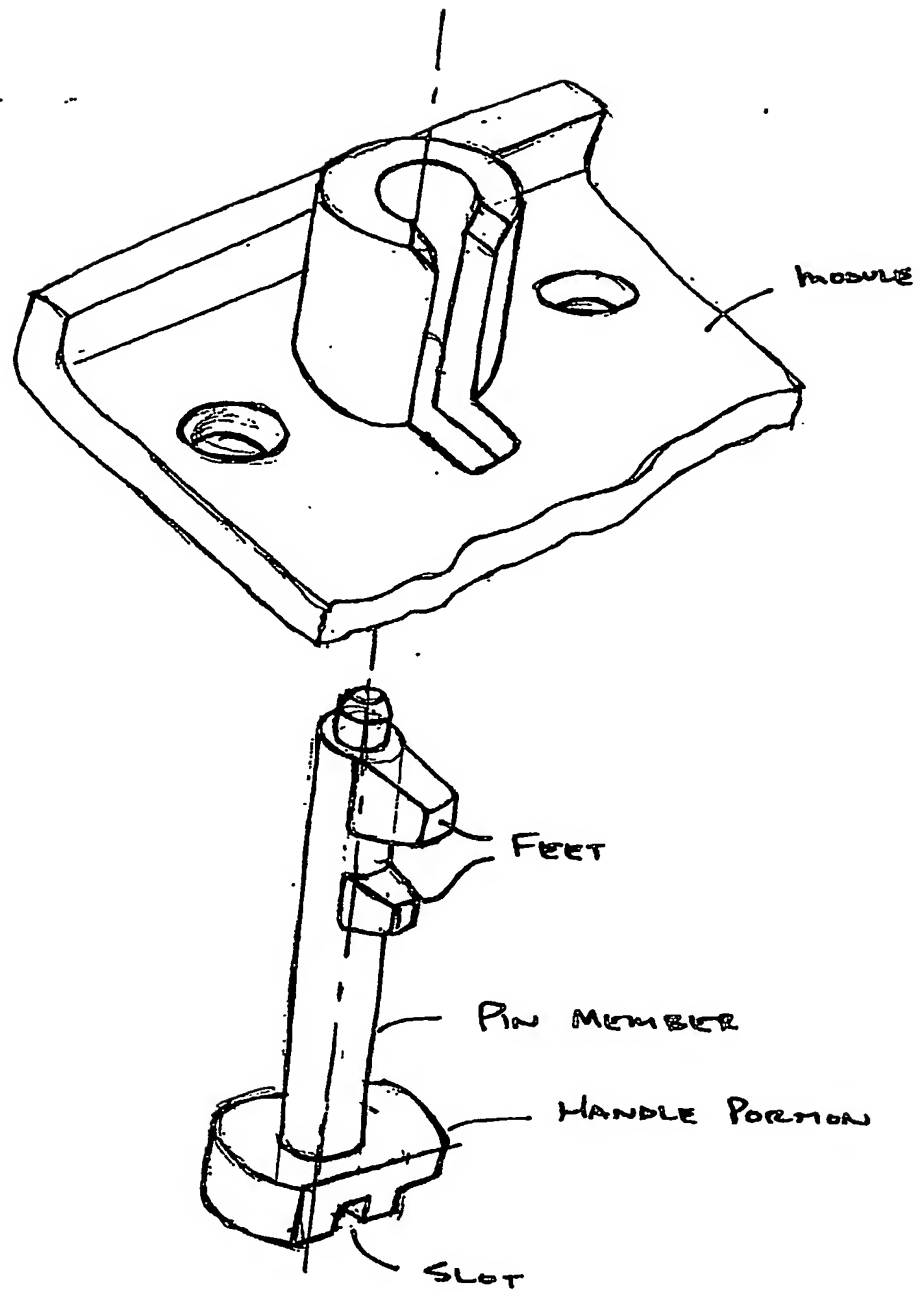


FIGURE 17

17/26

60468508.050703

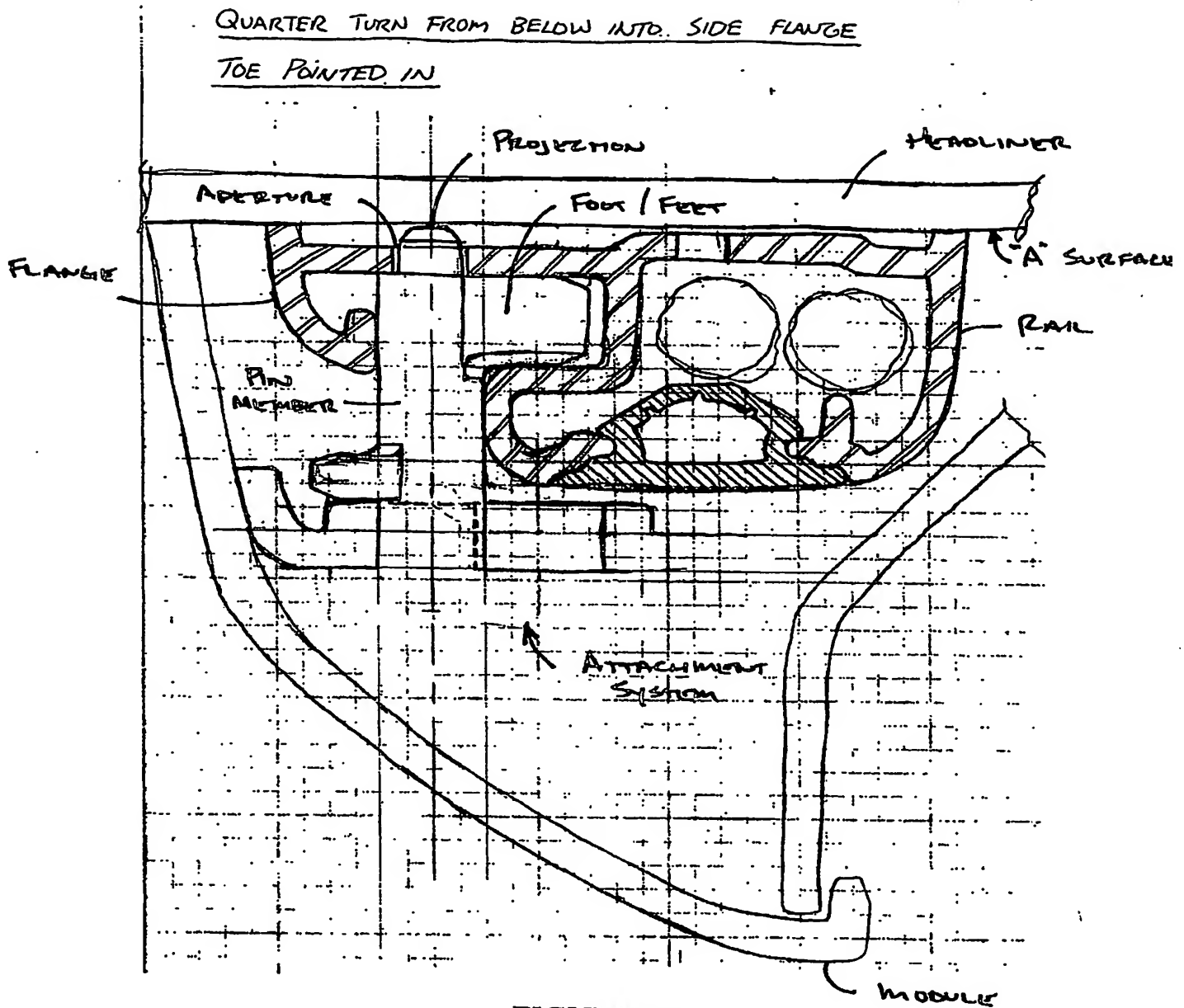


FIGURE 18

18/26

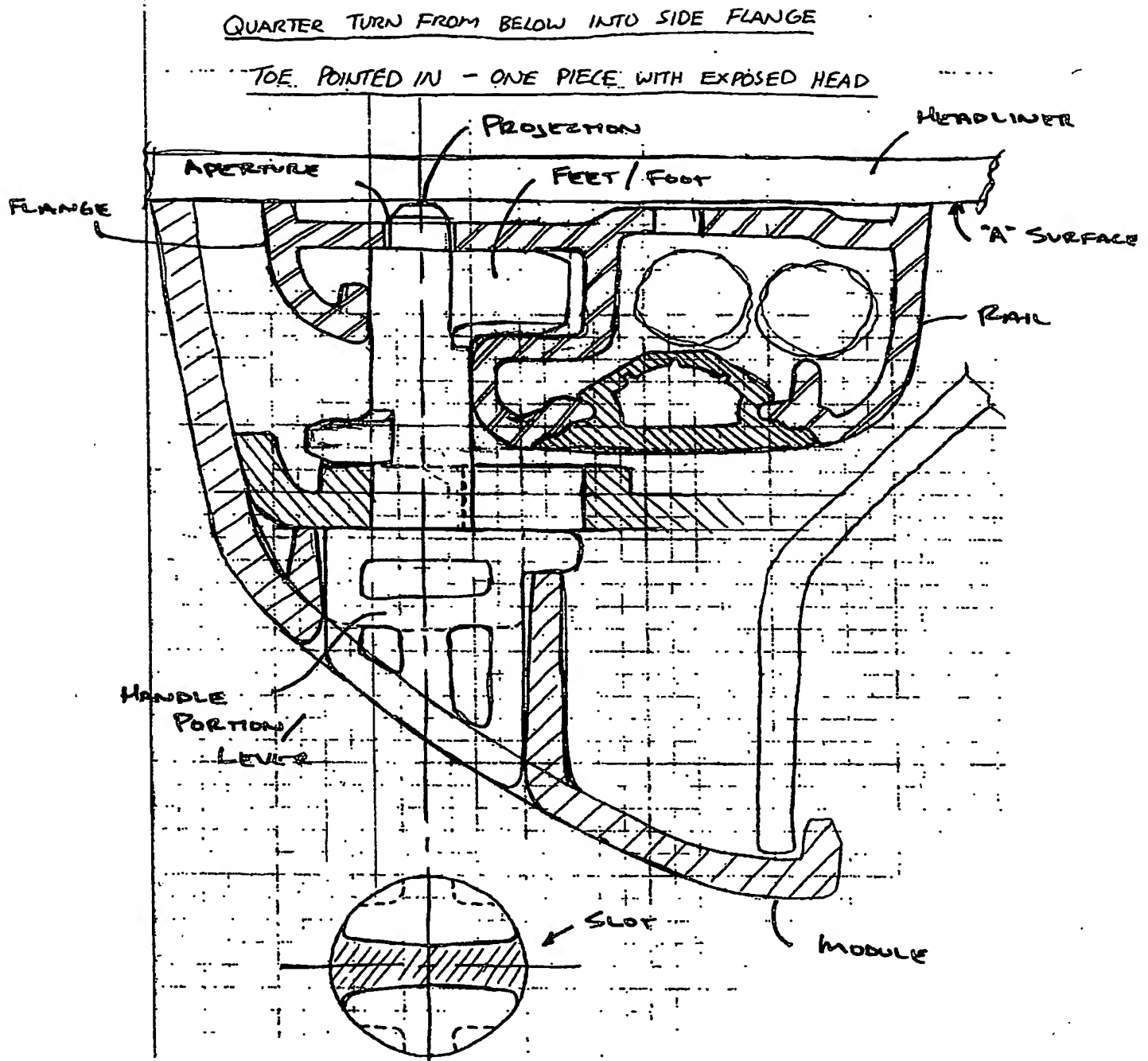


FIGURE 19

19/26

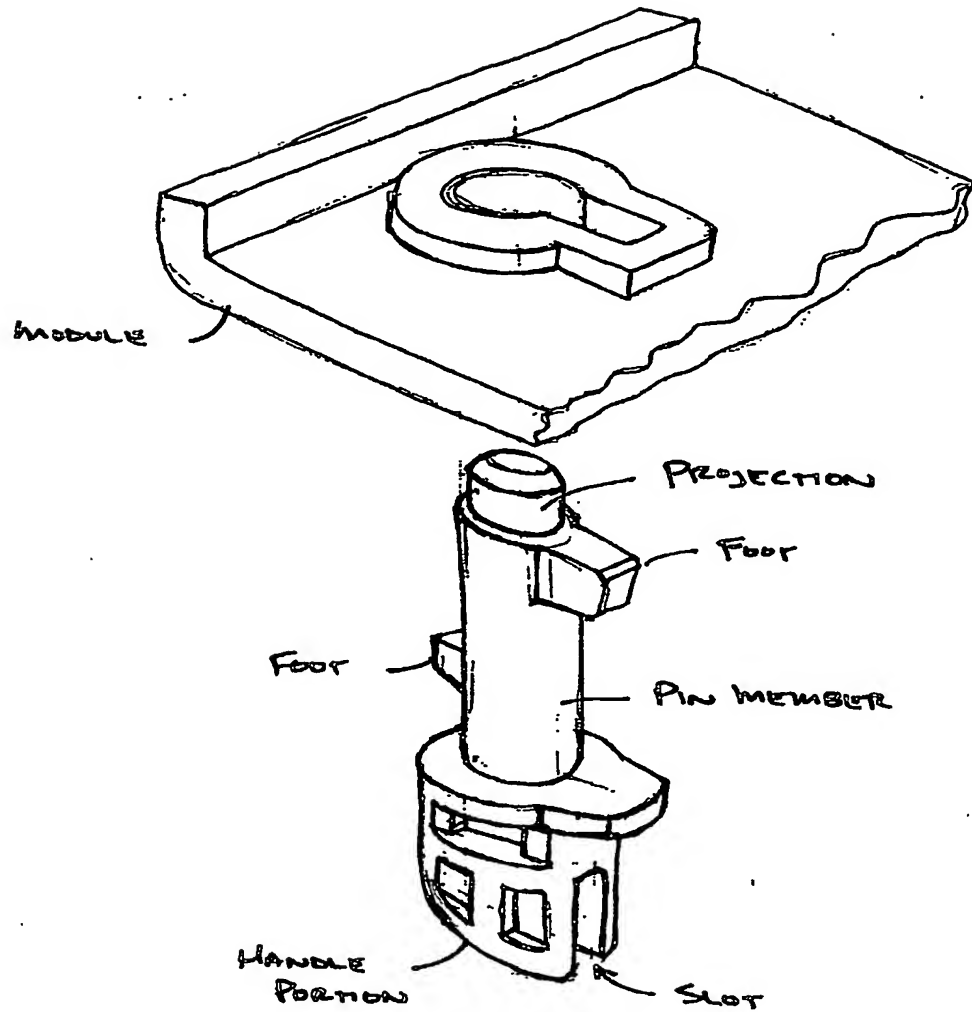
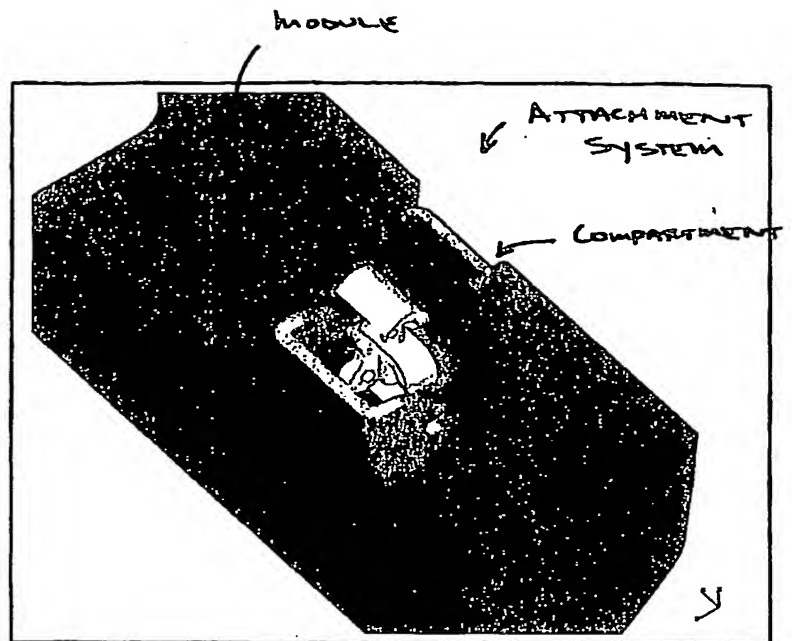
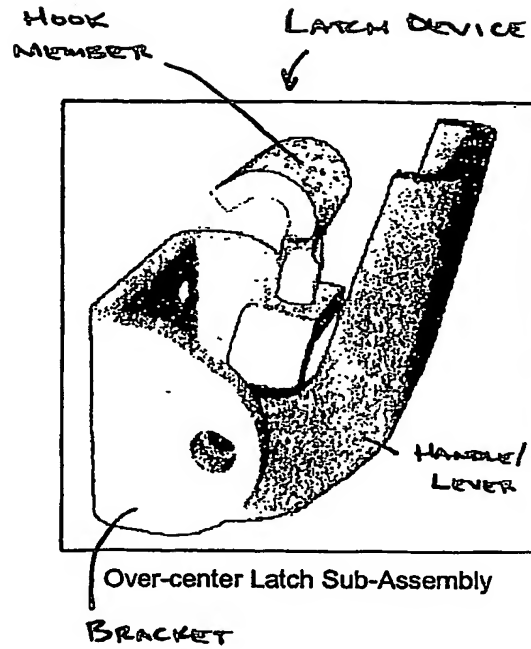
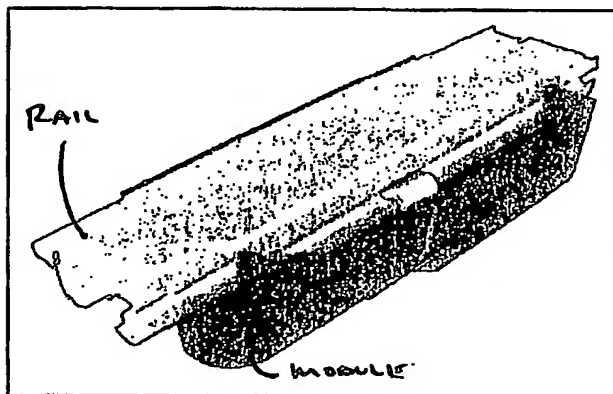


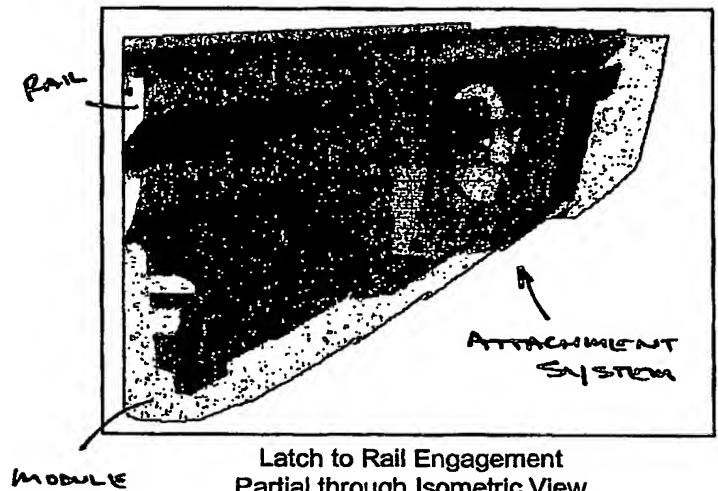
FIGURE 20



Backside Partial Isometric View of Latch in Rail Module



Latch to Rail Engagement
Partial Backside Isometric View



Latch to Rail Engagement
Partial through Isometric View

FIGURE 21

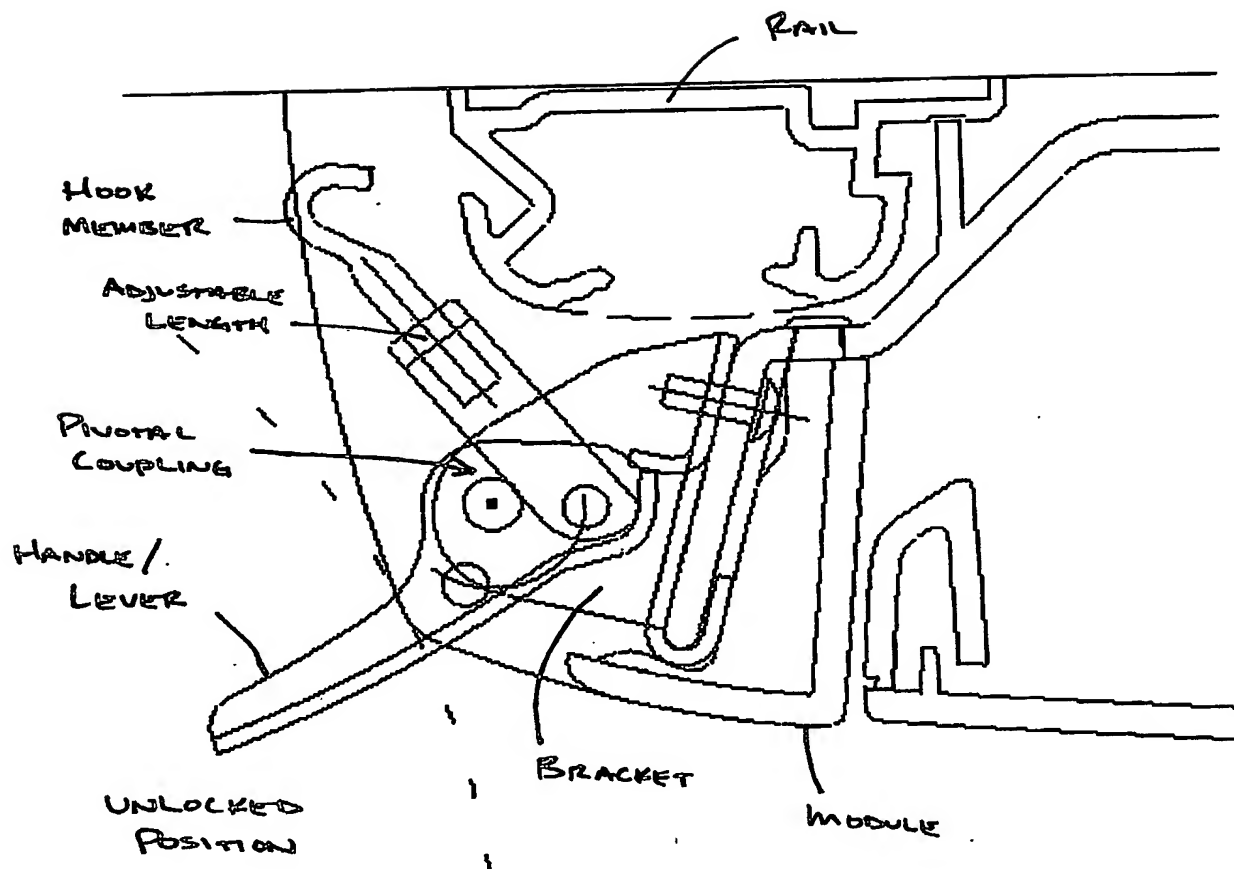


FIGURE 22A

22/26

60468508.050703

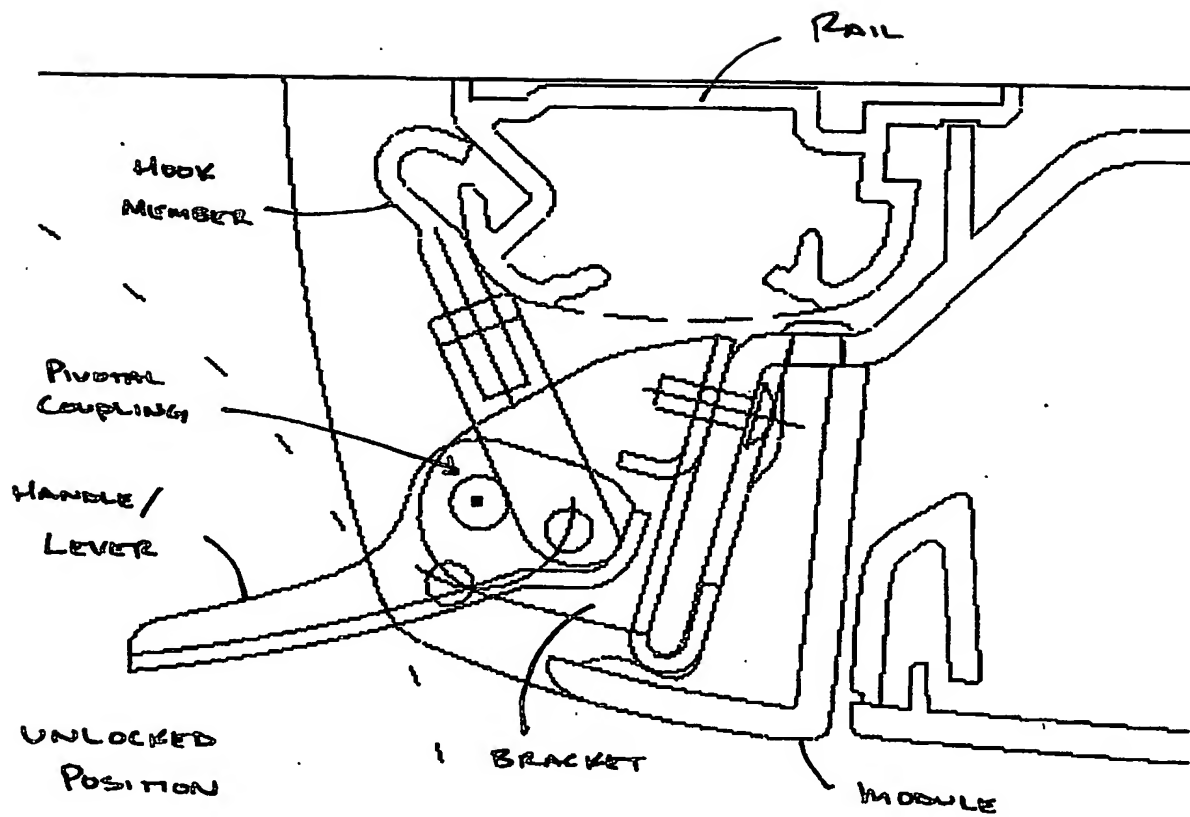


FIGURE 22B

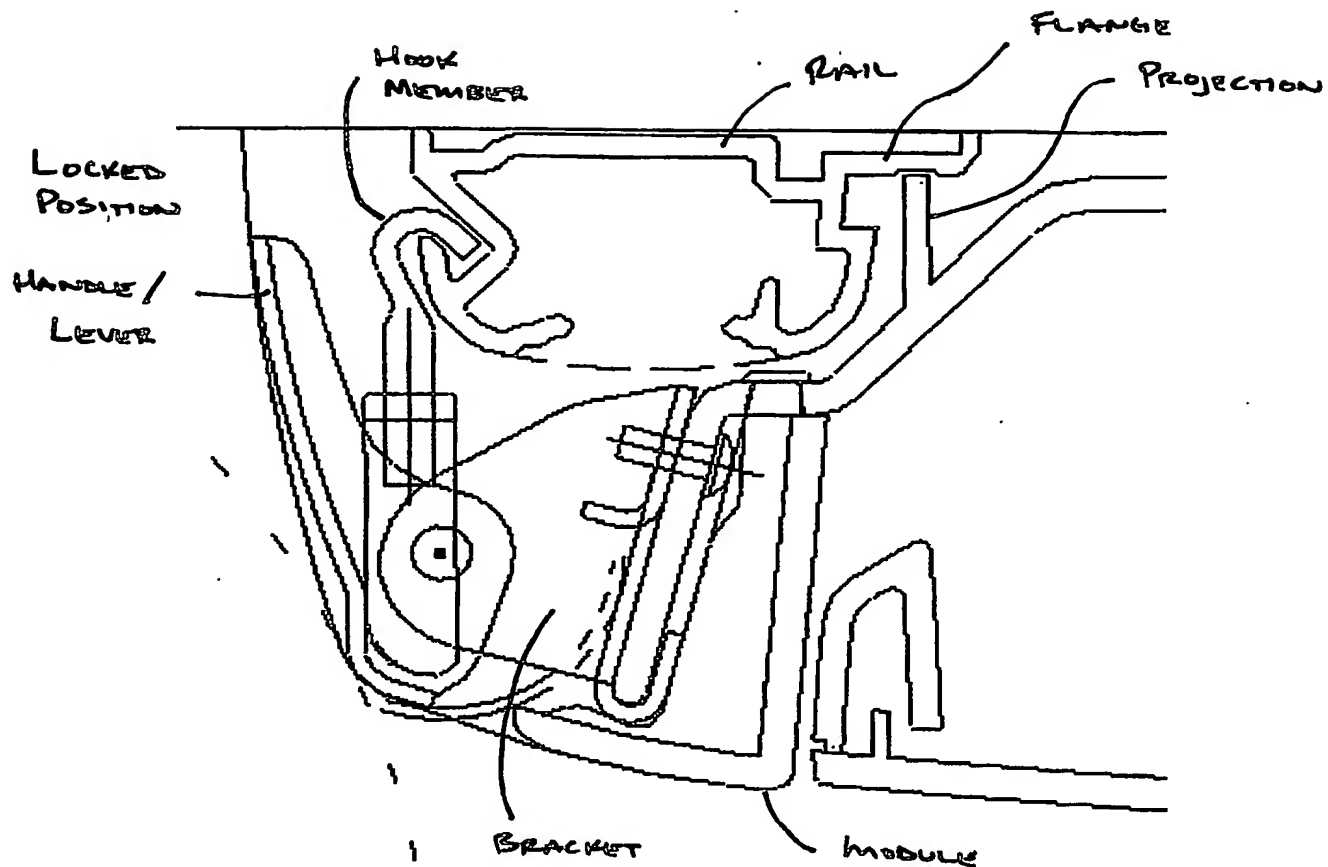


FIGURE 22C

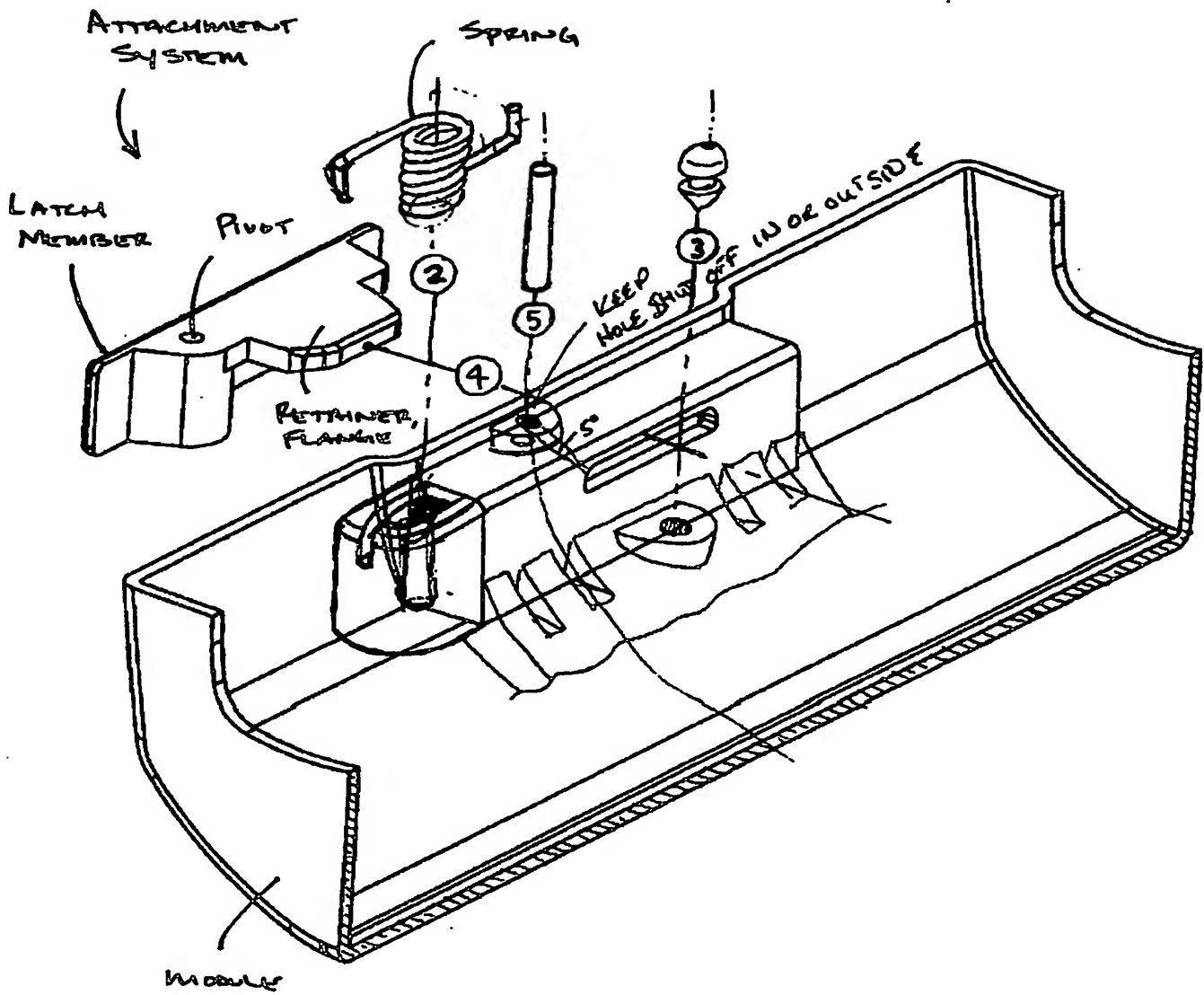


FIGURE 23

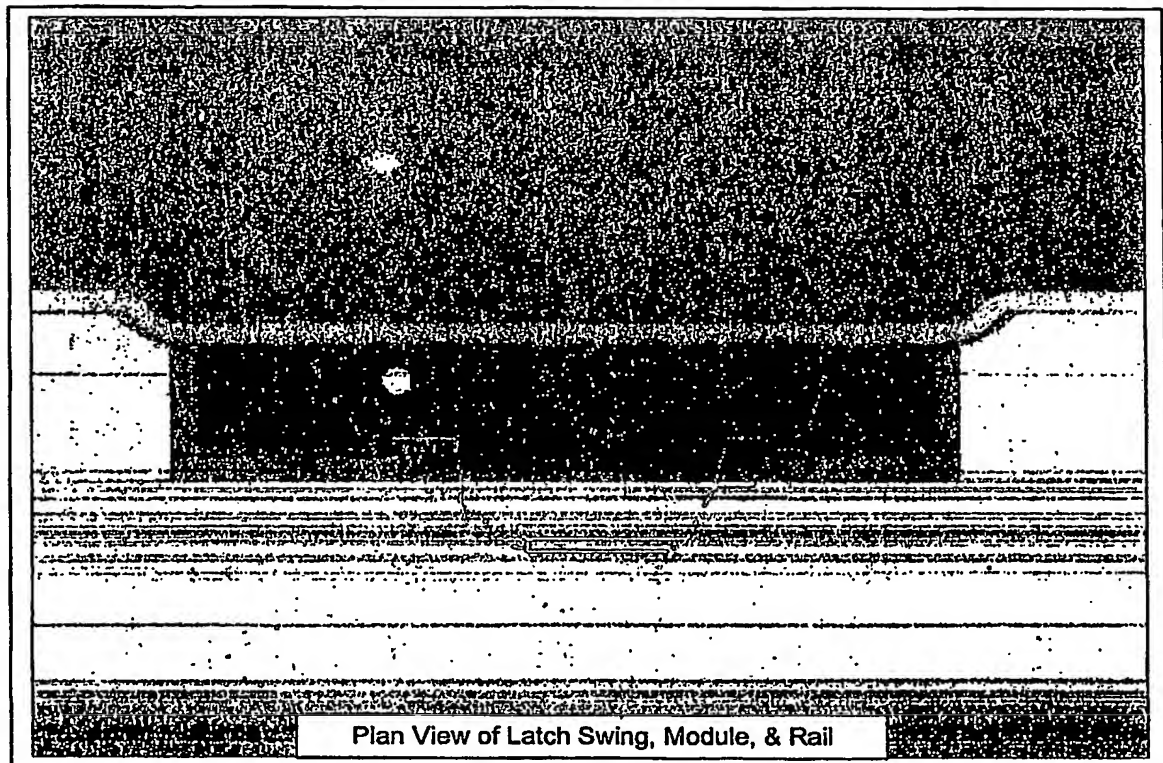
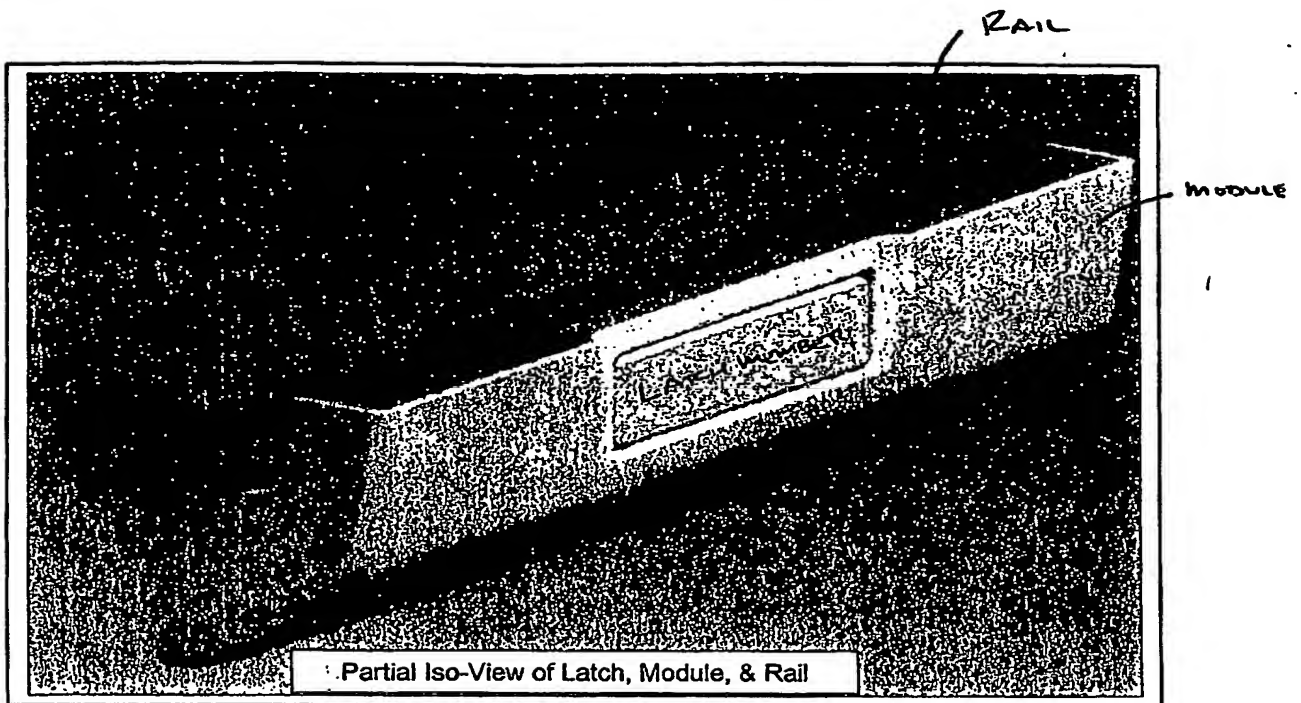


FIGURE 24

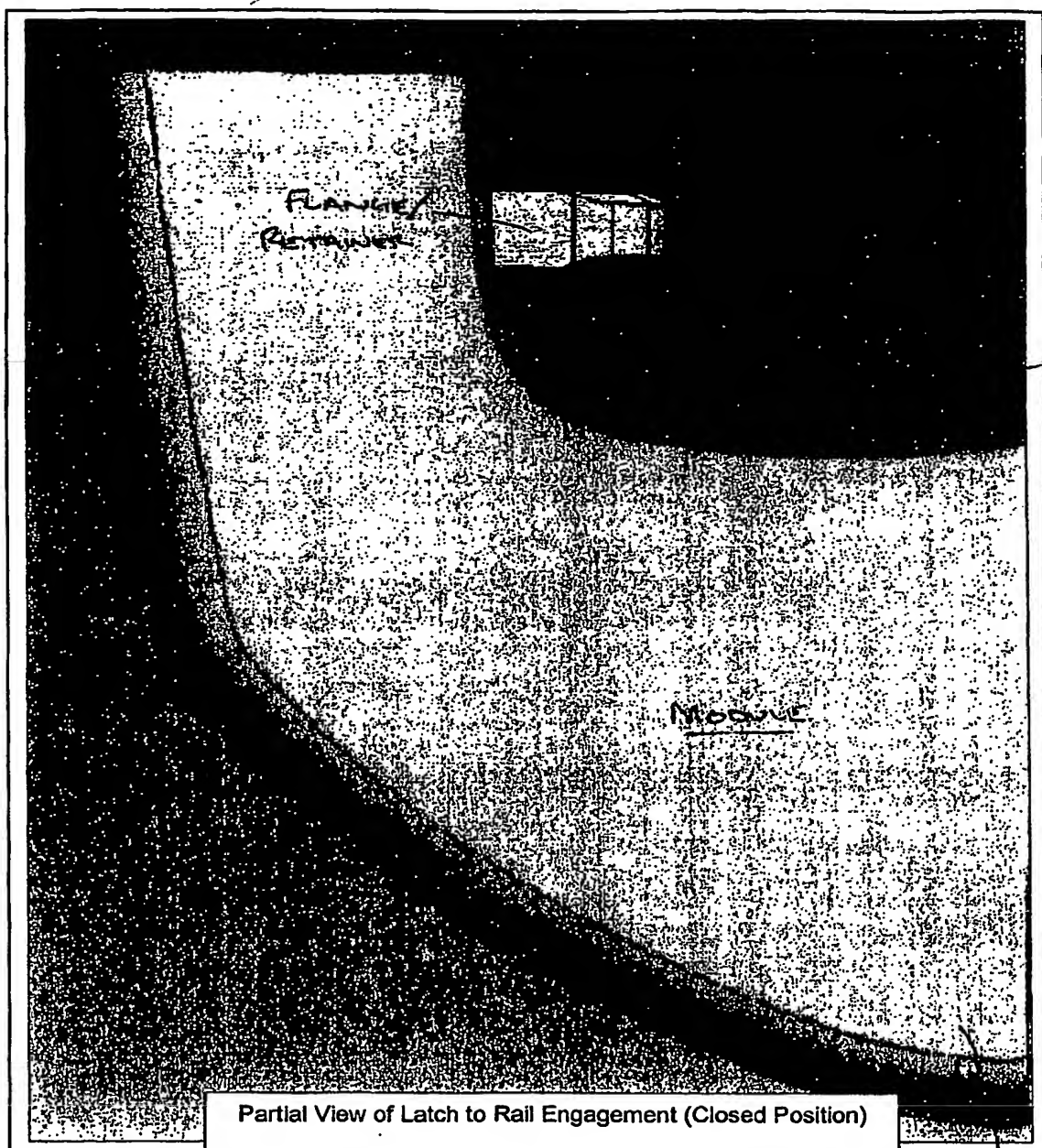


FIGURE 25

This Page is inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☐ BLURED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLORED OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☒ REPERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images
problems checked, please do not report the
problems to the IFW Image Problem Mailbox**